THE AMERICAN
GAS LIGHT JOURNAL

VOL. XCV., No. 13. **NEW YORK, SEPTEMBER 25, 1911.** WHOLE NO 1,894.

CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

The Making of a Retort, by "A Maker" 193
*The Use of Reinforced Concrete in Gas Works, by Mr. Henry W. Douglass 194
*Semi-Concrete Condenser House at Adrian, Mich., by Mr. E. F. Lloyd 197
Securing Increased Business, by Mr. G. D. Crain, Jr. 198
The National Mine Safety Demonstration 199
*Sugg's New Low Pressure Lamp 199
The Responsibilities of Electrical Engineers in Making Appraisals. 199
OFFICIAL NOTICES—
Sixth Meeting, American Gas Institute 200
EDITORIAL—
Twentieth Annual Meeting, Michigan Gas Association, Special Editorial Correspondence 200
Proposed Rules and Regulations for Service Supplied by the Gas Companies of New Jersey 201
The Function of Tar in the Condensation of Coal Gas, by Prof. Alfred H. White and P. S Tour 202
SPECIAL ENGLISH CORRESPONDENCE 204
Forty-two Candles per Cubic Foot—Gas Works in the Hot Weather—Coal Prices in 2100 A.D.
MANAGEMENT AND COMMERCIAL METHODS 205
Gas Lighting Maintenance—The Montreal (Canada) Light, Heat and Power Company—The Gas Appliance Store of the Portland (Me.) Gas Light Company.
Recent Patent Issues 206
Publications 206
ITEMS OF INTEREST FROM VARIOUS LOCALITIES 206
New Offices at Norristown, Pa.—Serving the Public in Jersey City, N. J.—Bronx Gas and Electric Company's Bond Issue—Sales per Capita, Toronto, Canada—A Gas Ordinance at San Jose, Cal.—Candle Power and Heat Units, Sioux City, Ia. Contracts for the Gas Machinery Company - A Canadian Plant vs. Reciprocity—Natural Gas Rate at Dayton, Ky.—Rousing Commercial Meeting, Newark, N. J.—Holyoke, Mass., Wants an 80-Cent Rate—Ballooning Under Difficulties—And Other Items.
The Market for Gas Securities 208
Meeting Times of the Various Gas Associations 208
Public Lighting Table for September, 1911 (Advertising Section).. 27

The Making of a Retort.

[Prepared for the JOURNAL by "A MAKER."]

My advice to those about to make retorts is, "Don't." If the desire has become a mania, and so must be gratified before relief is obtained, then go out and first catch your March Hare; in this case the hunted is the crude, undiluted fireclay.

A clay that having suffered severely from exposure to the point that it is all "broken up," should be cherished by the "Mud-man." Some clays are "a bit too thick;" but, even at that, you are dependent on them, and I advise giving them a "good spread," say, about 3 feet thick. Leave them in possession of the Bank, when they will repay your trust, become a matter of interest and pay you well, for the deposit. They do not pay any return at less than 6 months deposit, and it is well to leave them longer than that even, if they still show a streak of yellow. Turn them over to another bank, until the yellow drops out, as it is well to remember that it is not all glad that glitters. Treat the clay "white" and it will become "a good mixer."

When you have your mud so that it is as clay in your hands, take a goodly proportion of it and make it into dobies having the appearance of gold bricks, as these latter are the chief asset of the fireclay man, it is not necessary for me to give a description of them. As you value your sole source of revenue—the firebrick sales which follow the sell of the retort—do, I beseech thee hearken to the word of the prophet and make up fresh dobies for "grog." There is where the rogues and vagabonds of the firebrick business make a stick with which the guileless gas man subsequently knocks blazes out of their buckram. For it is known that these sinners go out into the highways and byways, seeking all sorts and conditions of used and abused firebrick, full of carbon, sulphur and quite a lot of so-forth and so-on. It is thus they seek to make grog; but such is not of the "grog" kind that makes glad the heart of the gas man, either in the bench or at the bar. Such grog is more like the illicit firewater of the Kentucky "farmer" and is not worth a dirham. Remember that old adage, "Fireclay is known by the grog it keeps company with."

Make your dobies fresh from good clay, and break them not so fine that the powder will pass through the eye of a needle. Let the lumps be 50 per cent. of the total of grog, measuring not more or less than 1 inch. Screen out the dust, as an honest retort man seeks not to throw dust in the eyes of the gas man. The scoffers will seek to put derision on me for advocating such large grog, but to all wise men hearkening is as obedience. The test of the "eye of the needle" is not one for the retort mix, as there is no hope of heaven for this product; the reverse road is the one to be travelled.

All retorts, like all makers thereof, catch (well, figure it out yourself) sooner or later. The 1-inch pieces of grog, in going through the wet pan, are further reduced, and care should be taken to make that mill a mixer of nut-sundaes—not of plain ice cream. Let it mix, but not too greatly mutilate. Examine, not the grog when it is large in the store shed; test it after it has been through the mill. Get all the dust out before it goes to the mill, since being mixed some of it gets beaten to a frazzle, whatever that basely coined word of the anti-nature fakir means.

The product of the mill should be two-thirds selected plastic clay and one-third grog, the size of salted peanuts; the balance is moisture, and not too much of it.

Do not use the "dough" as it comes from the mixer. Let it stand a week or two, like a "St. Louis Brown" baseball player on first base, until it sags at the knees. Let the dough rest for a week and be sure you always have a goodly stock. Remember the foolish virgins who went joy-riding with not enough pressure in the presto-lite tank. In plain English, be sure you have clay enough to finish every unit without having the Dago rammer stop for an hour or two to expectorate on his hands while you make up enough clay to finish the job. In plain American, Do not start anything you can't finish without loss of time.

Now, that you have your clay well weathered, made into dough and well tempered, do not throw it at the Dago in lumps as big as a baby's balloon. Predigested clay is that on which the retort fattens. There is a reason of many varieties. If you put in large lumps of dough they will remain separate units, no matter how the man with the pounder pounds. Set two shafts, fit them with teeth, gear them to rotate in opposite directions inward, and chew up that clay until it is all separated. That is the only way in which a homogeneous retort mixture can be made. Elevate your plastic grit to the platform, let two "huskies" put it in pails and pour it through their

fingers into the mold. The other two "huskies" will ramp like Trojans, if you make it worth their while; and it is worth your while to do so. A retort well rammed is worth its weight in gold; so saith the gas man, whose word let no man gainsay. It pays to have two outside molds for each size retort, one die for each pair of molds. Let the latter be well made and have the dies covered with copper. When the mold is rammed let it be upset horizontally on the truck so that the finisher can make it perfect. It should be thoroughly washed with a milk of clay having a very little salt in it. The head should be formed by hand, and as a retort badly made soon loses its head, do not be afraid that the finisher of retorts will make too much money. No matter what you pay him, he is worth it, provided he can make a good job. If he cannot make a good job, he thinks he is worth more than you give him. Tell him he is too good a man, and ask him to perform the "Wiley" pure food act. Let the bolt holes be true and large enough. It costs money to chip out holes when the retorts are delivered to a gas company. Most holes look fine on the surface but are rough-necks on the inside, sometimes tapering very badly. Next stand the retort on end, letting it rest on a flat board, which must have wedges underneath. Let the finisher daily see that the retorts are "on the level." Some folk are not particular about having their retorts upright, and that is the chief reason why profanity is so well practiced by masons. Remember a mason likes things on the "square." A bible-backed retort is an abomination and will result in settlement in the settings and unsettlement in the account. A retort that is not kept plumb is like a catastrophe; that is to say, it has a bad end to begin with and comes to a bad end in a little while. Let the retort be plastered with clay milk or mush, containing a little salt, and it will come out of the bakery looking like the cakes mother should have made. Burn them at least 14 days, letting the temperature of 2,600° F. be held for 48 hours.

Remember, clay should be weathered, but finished retorts must *not* be weathered. If you think one-third grog is too much then change the proportion; make it more nearly one-half. A retort is blamed for many faults which are due to the setting walls. A poor retort on 9-inch walls with 12-inch space, will outlast a good one on 6-inch walls and 9-inch spaces between.

The Use of Reinforced Concrete in Gas Works.

[Prepared by Mr. Henry W. Douglas, Ann Arbor, for the Twentieth Meeting, Michigan Gas Association.]

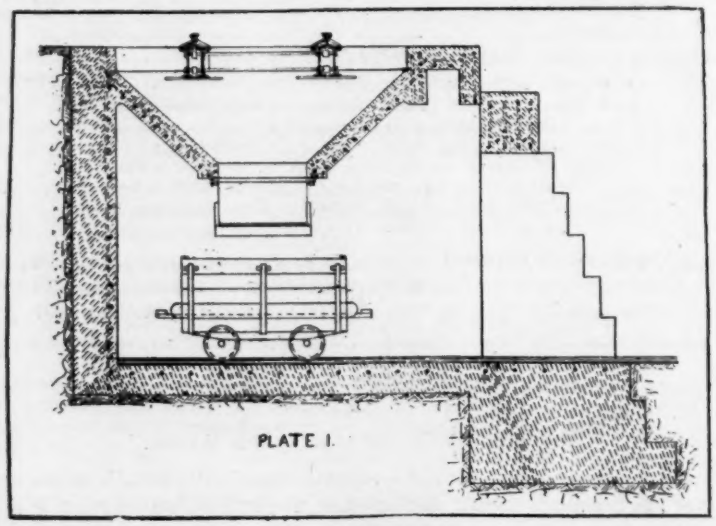
The use of steel and iron construction in a gas plant has meant to every superintendent continual care and painting, especially in places where these materials are exposed to steam and ammonia fumes, and many of us have had some sad experiences with short life in exensive construction of this nature. We are all looking for something which will replace these materials and have the advantages of strength, long life, small expense of upkeep and painting and absolute incombustibility. It has seemed to the writer that in reinforced concrete all of these desirable features are found, and possibly some practical suggestions derived from experience in this class of work, together with descriptions of some of the varied uses we have made of it, would be of interest to the Association. The intention of this paper is not to enter into the theoretical design of reinforced concrete, but rather to transmit to the Association some of the practical points learned from experience in this class of work. I will begin by some of the general precautions to be taken in all work of this kind.

Proper Foundations Necessary.—The first care to be taken in every case is to see that proper foundations are provided. An excavation should be made sufficiently deep to reach undisturbed soil, and if it is not possible to find a bearing which is hard and firm, and perfectly uniform under the entire foundation, the area of the foundation should be extended and strongly reinforced by the use of steel bars laid horizontally in both directions, thus forming a solid slab of considerably larger area than the actual structure. Too much precaution cannot be taken, especially if any considerable weight is to be carried.

Material and Mixing.—The best material to be used in making conrete will depend on the location, also which is cheaper and more convenient, gravel or broken stone. I believe equally good concrete can be made of either of these materials. If gravel be used, it should be perfectly free from any foreign matter, and the sand contained in it should be sharp and clean and all large stones should be removed. As the strength of the concrete lies in the strength of the mixture of sand and cement, the function of stone or gravel is simply to reduce the amount of cement required to fill the given space, and it should, therefore, be remembered that the proportion of sand and cement should be constant. The gravel should first be screened and the exact proportion of sand which it constains determined. It should be remembered that just enough sand and cement should be mixed with gravel to completely fill all the voids. Should the gravel not originally contain this proportion of sand, it should all be screened and a proper amount of sand added, giving a mixture of 3 parts sand and 1 part cement, or 2 parts sand and 1 part cement, as may be determined necessary from the nature of the structure. The amount so required may be determined by taking a measured quantity of screened gravel and filling with water, then measure the water required, and this will be the amount of sand and cement required to fill the voids.

Design, Forms and Reinforcing.—If the structure is one where strength is of great importance, the services of an engineer familiar with design of reinforced concrete should be secured to furnish plans for the reinforcing material required. It is the opinion of the writer that any good superintendent, with the service of one or two carpenters and the balance unskilled labor, can successfully build structures of various kinds of reinforced concrete. The longest and most tedious part of the work is the erection of the forms. These must, of course, be accurately built and solidly fastened in place so that the weight of the wet concrete will not spread or distort them in any way. When the structure is not required to be water tight, the retaining walls of the forms may be tied together with wires which are left in the concrete wall. Reinforcing material must be placed exactly where shown in plans and wired strongly in place, for in pouring concrete it is very apt to be displaced and its whole reinforcing value lost. If a smooth appearance is desired on the concrete walls, the planking or forms may be coated with any heavy, cheap oil, and the sharp corners on the edges, which frequently break off in taking down the forms, may be avoided by filling in the angle of the forms with a triangular wooden strip, thus leaving a beveled edge on all of the edges on the finished concrete. This adds greatly to its appearance. The cost of mixing concrete will, of course, be much reduced by the use of a machine mixer, and if the work is of any considerable extent, it will pay to purchase or rent a mixer. In selecting a mixer be sure that it will give positive proportions between cement, gravel or broken stone and sand. This is not true of some continuous mixers.

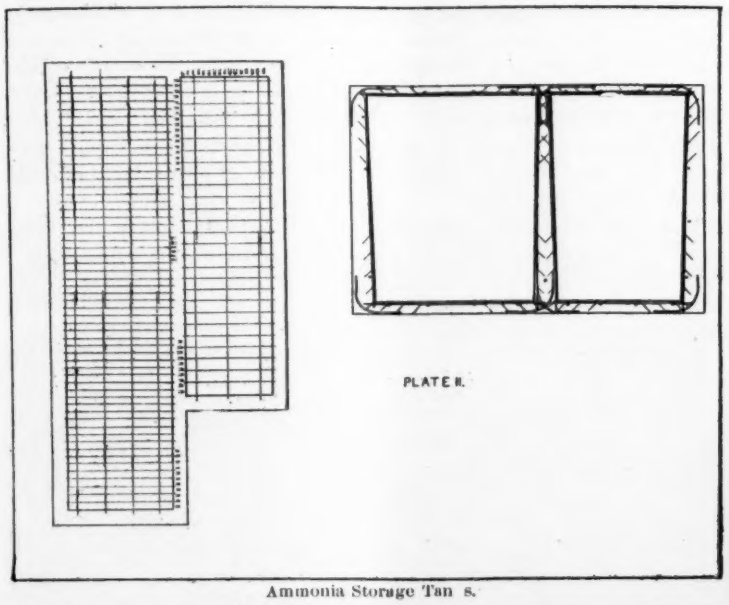
Concrete Coal Hopper.—Our first job of reinforcing work was a coal hopper built in our side track. We were fortunate in the fact that our side track lies about 12 feet above the lower floor of our retort house. This gave us an opportunity to build in this track the hopper referred to, shown in Plate No. 1. As this work had to be approved by the Railroad Company's engineer, the design which was very heavy was done under his inspection. We completed the work without difficulty, and no cracks have ever appeared in the structure. Although it has been in continuous use for 3 years, no abrasion from the coal falling into this hopper has shown anywhere on the concrete surface. The use of this hopper has proved successful and economical, and since its adoption we have not shovelled a pound of coal from the car, using nothing but hopper bottom cars.



Concrete Coal Hopper.

Ammonia Storage Tanks.—Our experience with steel tanks for storing ammonia has proven most unsatisfactory to us, the life of

tanks with the best of care being very short. In 1909 we built two tanks of reinforced concrete, the general design of which is shown in Plate No. 2. As can be seen, these tanks are built together, using

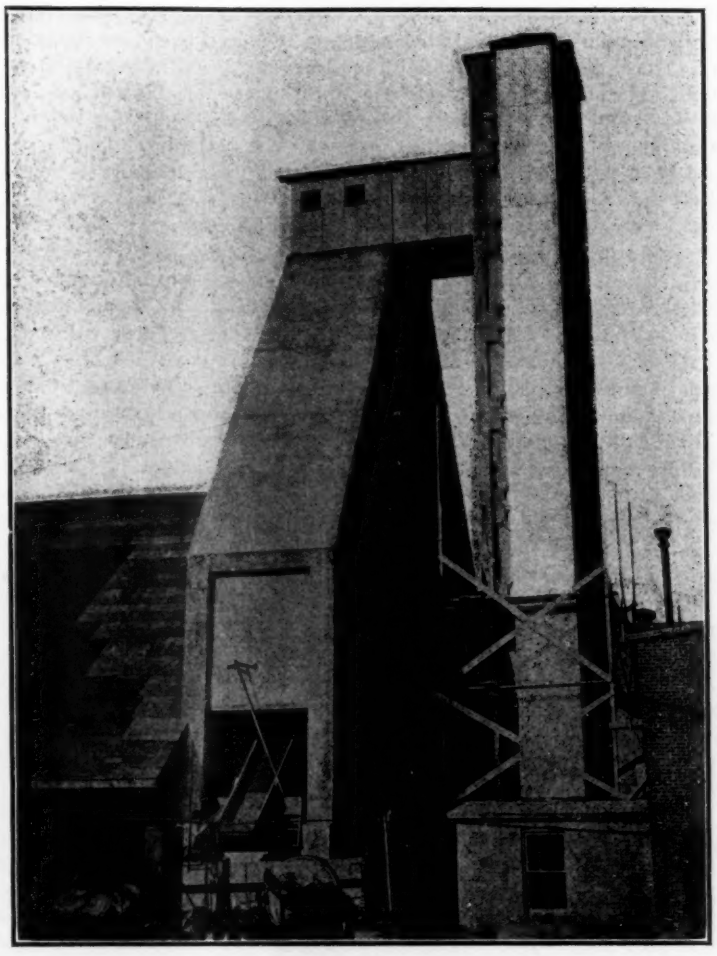


Ammonia Storage Tanks.

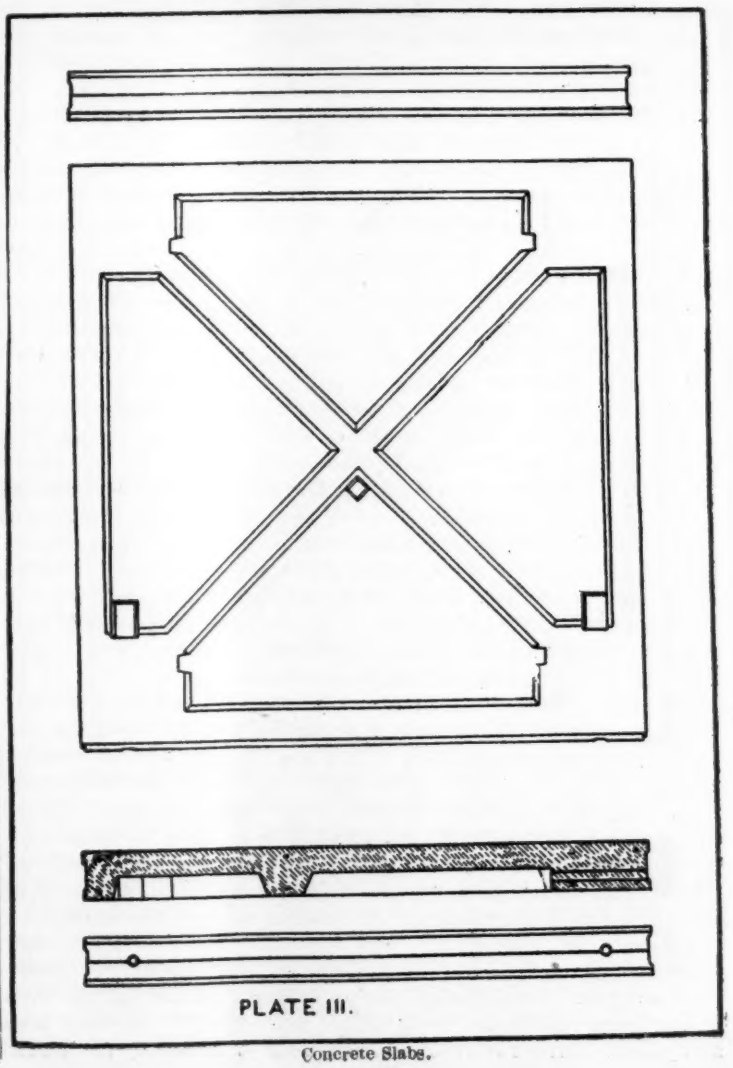
one common wall. The dimensions of the larger tank are 40 feet by 10 feet 1½ inches by 13 feet 2 inches deep, and it has a capacity of 27,853 gallons. The smaller tank, used for storage of concentrated liquor, is 30 feet by 8 feet 1½ inches by 13 feet 2 inches, and has a capacity of 17,091 gallons. In order to economize in yard space, and to get a fall from the ammonia still to the tanks, they were put under ground. Owing to the nature of the soil, this very largely increased the expense and trouble of construction. We encountered both quicksand and water in making the excavation and no good soil could be secured for the foundation. We were obliged to sink a pit outside of the excavation and put drains under the entire tank bottom, pumping from the pit during the entire period of construction. The presence of so much water in the soil required the tanks to be not only tight as to their contents but also that they must be tight from external water pressure. After the excavation was made, and the form was put in place, the entire bottoms of the tanks were first run. If external water is encountered a bottom course, about 2 inches thick, of concrete, containing stone or gravel not in excess of ¾ inch diameter, should first be laid, and then a coarser concrete on top of this. After the bottom is in the sides and top should be run without break of work. It required about 21 hours to mix and pour this concrete, 2 shifts being used so that the work continued without stopping. This is very important, as any break will leave a weak point in the wall, which is very apt to leak. Too much care cannot be taken in concrete work, which is intended to be water-tight, with careful ramming and working of the mixture into the forms. The manholes were put in place in the form and concrete run around them so that they were permanently in place. Pipe connections may be put in the same way, and an opening can be left, by the insertion of a nipple or block of wood, and flanges put on by drilling holes, using expansion bolts. The total cost of construction of these tanks, having a joint capacity of 44,944 gallons, was $1,687.74, divided as follows:

Items.	Cost.
Labor	$717.48
Lumber	283.08
Gravel	89.83
Cement	228.25
Reinforcement	339.58
Manholes	29.52

Or a total cost of 3.7 cents per gallon of storage capacity. This figure is very close to the cost of steel tank storage, and I believe will last many times longer. After the forms were removed, the inside of the tank was plastered with about ½ inch of cement plaster, containing 2 parts sand and 1 part cement. When the pump was stopped and the external water allowed to rise, we found that the pressure being too much for this plastering was forced off in many places, showing a leakage from the outside. All of it was chopped off and the wall thoroughly roughened, and, after thoroughly cleaning and whitewashing with neat cement, we again plastered with a lighter coat. This proved entirely satisfactory and the tanks have been absolutely tight since that time. Had proper precautions been taken in working the cement in the forms this plastering would not have been necessary.



Coke Elevator Tower of Concrete Slabs.



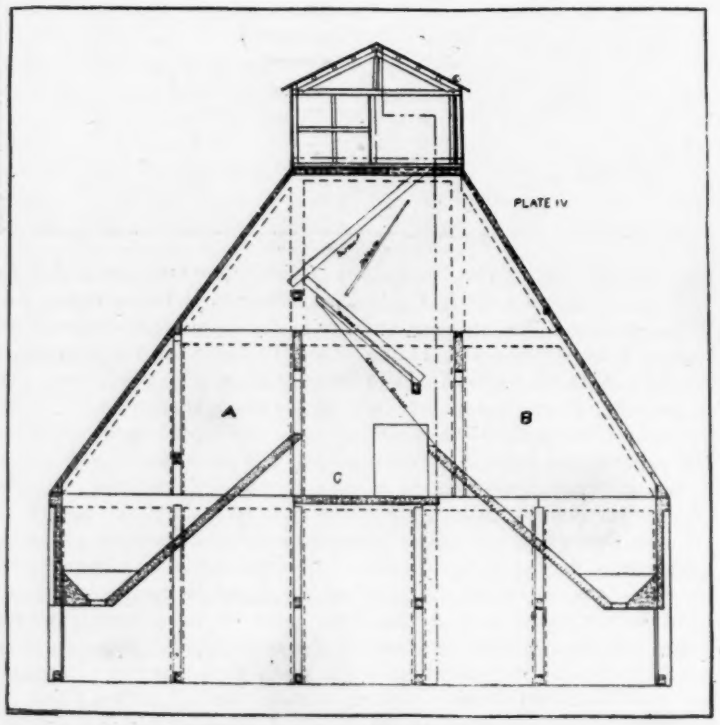
Concrete Slabs.

Small Displacement Tank.—Our success in building these large ammonia tanks leads us to try reinforced concrete in the construction of a small displacement tank in our circulating hydraulic main system. The steel tank formerly used for this purpose did not last over 3 years, and at a very small expense we were able to build a concrete tank about 3 feet by 3 feet by 4 feet, which was absolutely tight. The walls of this tank were only 2 inches thick, reinforced with round iron rods which were carried up the sides and threaded on the ends to bolt down the cover, which was a steel plate.

Retort House Floor of Concrete.—Every gas engineer who has had experience with a double floor retort house is thoroughly familiar with the disadvantages and dangers of an iron or steel floor carried on steel I-beams. The vapors from the quenching of coke below the floor rust the beams so rapidly that, before we are aware of it, they are in dangerous condition, and accidents due to their failure are not uncommon. The writer had experience with such a floor, in which, in spite of the greatest care in ventilating the retort house, the floor beams were rusted out within 6 years. In 1908 and 1909 this floor was entirely replaced with reinforced concrete. The old floor was carried on 15-inch I-beams, running from the retort house wall to the buck bars of the benches. These were left in place and used as reinforcing material for the concrete beams which carried the floor. However, as there was plenty of room in the basement, concrete posts, 12-inch square, were put in about 8 feet from the bench front, so that the structure is now carried independently of the benches. After the iron floor and beams were removed, the entire space was scaffold, boxing in 15-inch I-beans referred to, leaving the supporting columns open into the space above so that, in filling with concrete, the columns were cast in unit with the floor and reinforcing bars carried over these beams in each section. The floor was 8 inches thick. A space of 2 feet was left open immediately in front of the bench to permit the steam from below the floor to be carried up by the heat from the face of the bench. MacDonald-Mann coke chutes are used in this retort house, and steel frames (with doors attached) were put in position in the floor before the concrete was run. A floor scale was also placed in position, completely incased underneath, so that the steam from the coke could not reach it. In front of the benches 2 rows of the old iron floor plates were laid in the concrete, for the reason that hot coke falling on the floor would crack the surface of the concrete and cause it to chip off. A similar row of plates was put at the back of the house for the reception of the hot rakes. The concrete used was 3 parts of washed gravel, 2 parts sand and 1 part cement, and the top finish (about 1 inch in thickness,) 2 parts sand and 1 part cement was put on. After this was struck level with the straight-edge, it was finished smooth with a trowel, when partially set. We now have a floor which has proven satisfactory in every respect. The steam is all confined to the cellar, except where it is allowed to pass up the face of the benches and no iron work is exposed. The surface of the floor is not as slippery as the iron floor and the men prefer to work on it. Coal trucks are handled with greater ease, as the surface is perfectly smooth, and in hot weather it is much cooler and easier on the stokers.

Coke Elevator Tower of Concrete Slabs.—In October, 1910, the coke elevator and screening plants which were built entirely of heavy timbers, were completely burned at the risk of the rest of our gas works. When this elevator was first built we considered both the use of steel and reinforced concrete; but, after visiting some plants built of the former, we concluded that its life would be too short, due to rusting from the steam of the hot coke, to be economical. Bids received for the construction of reinforced concrete were so high as to be out of consideration. In rebuilding after our fire, however, we could consider nothing but fireproof material, and decided that we had had sufficient experience in concrete work to erect the structure ourselves without letting contract. Plans were not ready to begin work until the middle of November, and the elevator tower, shown in the photograph, was built under the most adverse weather conditions, much of the time the temperature being but little above zero. This tower was built of slabs, 9 feet square, details of which are shown in Plate No 3. Four moulds were made for these slabs, which were all cast on the ground and raised in position. A scaffold, of the height of a little more than 2 slabs, was built in the tower of the exact size of the opening. A hoisting engine was secured, and the slabs, which weighed 5,700 lbs. each, were raised into place and bolted together, the bolts being placed in the molds before the concrete was run. No difficulty was experienced in making the bolts fit the holes exactly and the structure was carried up perfectly true and plumb. After 2 rows or tiers had been thus raised, the tackle was hitched to the top of the slabs, the scaffold thus raised up and timbers put in underneath to hold it in position, and 2 more rows of slabs were then raised. This was continued throughout the entire height of the structure and no outside scaffolding was necessary to put the slabs in place. The tower, which was 73 feet high, was successfully completed on December 30th. Owing to the extreme cold weather, it was necessary to use hot water in mixing the concrete. The forms were covered with tarpaulin, and fires kept underneath until the concrete was completely set. The faces of the molds were oiled after each run and the tower presents an appearance as smooth as that of cut stone.

The Coke Screening Plant.—The screening plant was not built until the following summer, as we felt we could not safely undertake this work in the cold weather. The general form of the structure is show in Plate No. 4. The most difficult and tedious part of



The Coke Screening Plant.

this task was the erection of the forms, which was largely carpenter work, and the placing of reinforcing material, the actual pouring of the concrete being a comparatively small matter. The elevator tower previously erected was used to raise all of the concrete, which was dumped from the top into a chute, where it ran to the mixing board, from which it was shovelled into the forms. As the walls of this structure were only 6 inches thick, the concrete had to be exceptionally thin and was very carefully worked in place. As will be seen in the drawing, the coke passes over the 2 screens for sorting into pockets, *A* and *B*, for egg and nut coke, respectively, and the breeze passes down through the center to the ground. When the pockets, which hold respectively 75 and 68 tons of coke, were completely filled, coke was discharged into cars on the track at *C*. Delivery wagons can be filled directly from the boxes which have hopper bottoms with valves. Our short experience with the wooden structure showed us that wet coke would soon rot out the pockets and that fire could be very easily started from dropping of coke not thoroughly quenched. We are now free from all danger of this kind and have a structure which will last forever. The elevator tower is entirely built of reinforced concrete, including the roof, while the top of the screening tower, for the sake of economy, is covered with corrugated asbestos sheeting.

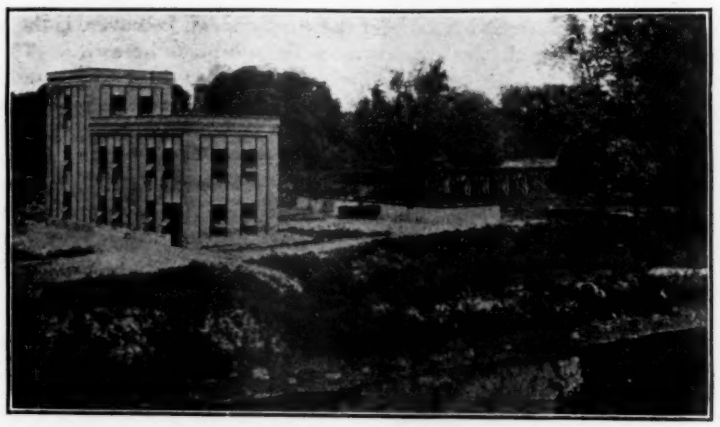
Future Additions.—We expect to erect in the near future a water-softening plant, consisting of cylindrical, reinforced concrete settling tanks; but as its construction is simple, compared with the structure just described, we have no fear of our success in making it perfectly water tight and strong.

The writer has no doubt but that even some of the smaller plants can find many uses for reinforced concrete, and believes that much work can be done without the employment of much skilled labor. I hope some of the suggestions contained herein may be of value to those contemplating this class of work.

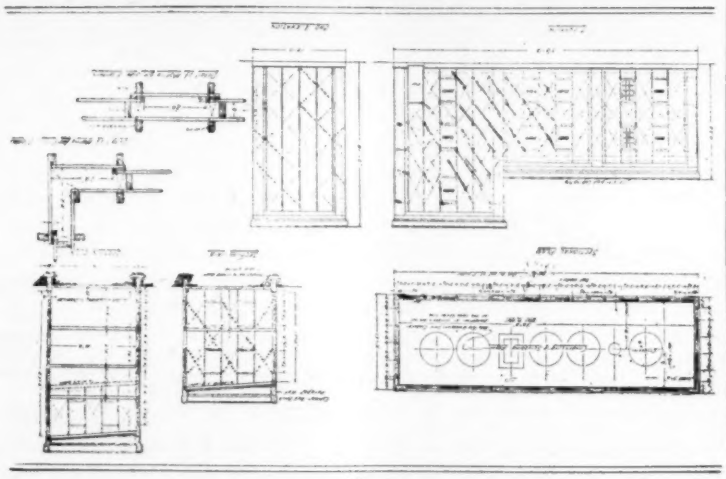
Semi-Concrete Condenser House at Adrian, Mich.

[Prepared for the Twentieth Meeting, Michigan Gas Association, by MR. E. F. FLOYD, Adrian, Mich.]

In 1908 the Adrian Gas Company undertook the complete rebuilding of its manufacturing plant, including therein the construction of a condensing and scrubbing installation with the building therefor. The subsoil, being of rather donbtful quality, and the question of economy being a desideratum, it was decided to put up a building that would accommodate itself to some possible subsidence of the ground, that would be cheap to construct, sufficiently fireproof to require no insurance, and while not decorative, yet of a generally pleasing character. Accordingly, the work was carried out as shown by the attached photograph and plans.



Photograph of Exterior.

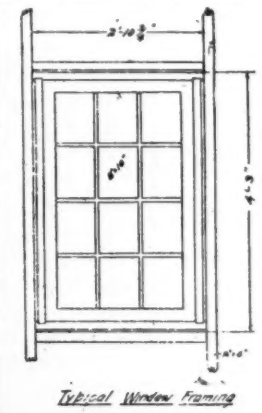


Plan.

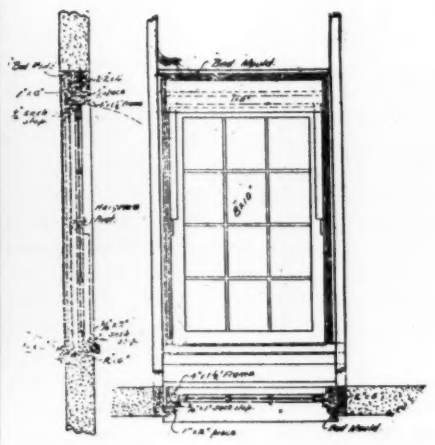
A foundation wall was first built of concrete about 12 inches thick, made in the usual manner by constructing a matrix and filling it in. This was not reinforced. On the top of this wall, and before it had set, was embedded a 2-inch by 4-inch scantling, laid flat and set back 1 inch from the proposed face of the wall above.

On this light sill were erected 2-inch by 6-inch stubs of the required height, some of them being in a single piece, others, in the higher part of the building, in two lengths, spliced. These were connected together at the top with a 2-inch by 4-inch plate, similar to the sill below; 2-inch by 6-inch rough sills and heads were inserted for windows, etc., as indicated. This constituted all the wood in the framework of the building.

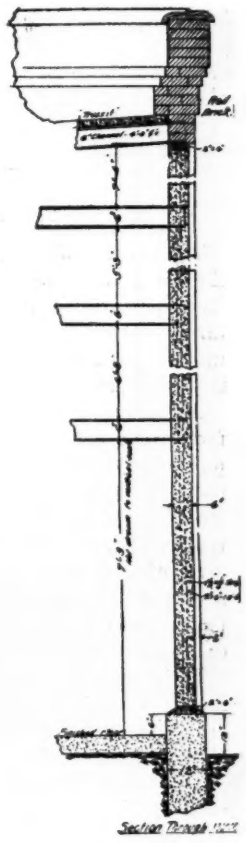
To suitably stiffen this framework, holes were drilled in the studs with "seconds" fence wire, procured from a local fence factory, run through these holes in the studs in a generally diagonal manner, as indicated by the dotted lines on the several elevations. These wires were then twisted tight, forming substantially a basket construction having extreme rigidity and lightness. Thereafter, forms were made in the shape of ordinary matched pine flooring, put up in the manner of doors, long enough to span about 3 spaces and about 30 inches high. These were conveniently fastened to both sides of the studs; ordinary ¾-stone concrete was filled between them, being spaded down against the forms to bring the fine material to the surface of the walls. As the concrete set sufficiently to hold itself in place, the forms were removed and placed elsewhere.



Typical Window Framing.



Section Through Window.



Section Through Wall.

Plan.

The method of forming pilasters on the exterior face was accomplished in a simple manner, as indicated by the detail on the drawing. The various forms were held in place, either by nailing to the studs or by passing wires through the forms and tightening them to hold the latter to the studs. These wires were afterwards snipped off at the wall surface. The work thus continued until the plate at the top of the studs was embedded in concrete. As the work progressed the requisite channel posts for the mezzanine floor and roof were placed.

The roof and the mezzanine floor were constructed by laying trussit metal, transversly on the steel channel joists, after which concrete mortar. made of sand and cement only, was spread over the top of the metal, the latter being sufficiently stiff to carry the workmen. After the mortar applied to the upper side of the metal had partially set a plaster coating of the same was applied below.

When the whole structure had completely set a parapet wall of common brick, merely for ornament, was built around the entire building, as indicated, being coped with ordinary 12-inch vitrified coping tile.

Frost intervened during the construction of the works, and the high portion was not completed as to concrete until the following spring; meantime the roof over the lower portion successfully went through the winter.

During the next summer a hot day was selected, following a dry period, when coal tar was swabbed over the cement forming the roof. This had sufficed to keep the building water tight. After the walls were completed and thoroughly dried, and the windows, etc., placed, the outside faces of the 2-inch by 6-inch stubs, which, of course, are flush with the face of the concrete, were covered with vertical 3-inch by 1-inch cypress strips, chamfered and finished in natural oil.

Unfortunately, owing to the long delay in the construction of the building, the cost figures upon the work are not sufficiently accurate to be quoted with confidence, but it will be obvious that it is an economical construction and in durability will doubtless outlast its usefulness otherwise. As to its fireproof qualities, it is well-known that a joist of wood embedded in masonry will burn but very slowly, principally charring on the exposed surface. The building for its purpose is, therefore, practically fireproof. An occasional coat of tar applied to the roof will prevent that from leaking. The only skilled

labor employed in the entire construction, was in laying the brick parapet. The building has been highly satisfactory for its purpose, and a power house, which will shortly be constructed at the same plant, will be built on the same general principles.

Securing Increased Business.

By G. D. Crain, Jr., Louisville, Ky.

The work of developing new business by a public service corporation, it goes without saying, is one of the most important to which its efforts are given. Securing an increased business usually means larger returns on practically the same investment, and, therefore, up to a certain point, new business can be taken care of at less cost than that which has been assumed before.

As a foundation for getting new business, however, at least two factors should be considered and worked out. One is educating the public as to the commodity or service which the corporation is in a position to furnish; the other is getting the information relative to the "prospects" for new business in such shape that it can be easily referred to and easily corrected and kept up-to-date.

In other words, if the public knows all about what it can buy from a corporation, and if the corporation in turn knows about who the people are who are most likely to ask for its service, the problem of deloping new business is considerably simplified.

The Kentucky Heating Company, of Louisville, Ky., has been doing work along these lines in an effective manner, and has succeeded in getting to the comfortable point where business is coming in almost of its own accord. This does not mean that it no longer requires effort to develop it; but that the minimum effort is now needed.

In connection with its plans for educating the public as to its service, the Company, which is restricted by its charter to the sale of gas for fuel, has now in progress a contest which has attracted much attention and has resulted in the dissemination of a lot of information that it would have been hard to get attention for in any other way.

Announcement was made of plan for the distribution of about $500 in prizes, the awards to be made to writers of the best essays on the topic of the advantages of "Kentucky Heating Gas for Cooking and Other Uses." The prizes were arranged in various classes, one being open, another being restricted to school teachers, and a third to pupils in public or private schools in Louisville. The first prize amounted to $50; the second to $25; following which were 12 prizes of $5 each. Prizes to the number of 321 were given to school children, in addition to which a prize of $1 was given each week to the writer of the best essay submitted during that week.

While the announcement of the contest itself stimulated interest in the Company, the greatest benefits were secured through the distribution of pamphlets prepared by the Kentucky Heating Company for the use of contestants. These contained a full description of the method of manufacturing gas, the various kinds of gas used, the ways in which it can be utilized, and its cheapness, compared with coal or coal oil, for fuel or cooking purposes.

The pamphlet makes out an excellent case for gas. It is a truism that the public knows very little about the work done by service corporations in preparing to meet the needs of the communities they serve, and a great deal of the matter which the Company prepared came as "news" to the readers of the pamphlets, who, being prospective contestants, read it more closely than if it had been indiscriminately distributed. An idea of the effectiveness of the pamphlet is suggested by this sentence contrasting cooking by coal and gas:

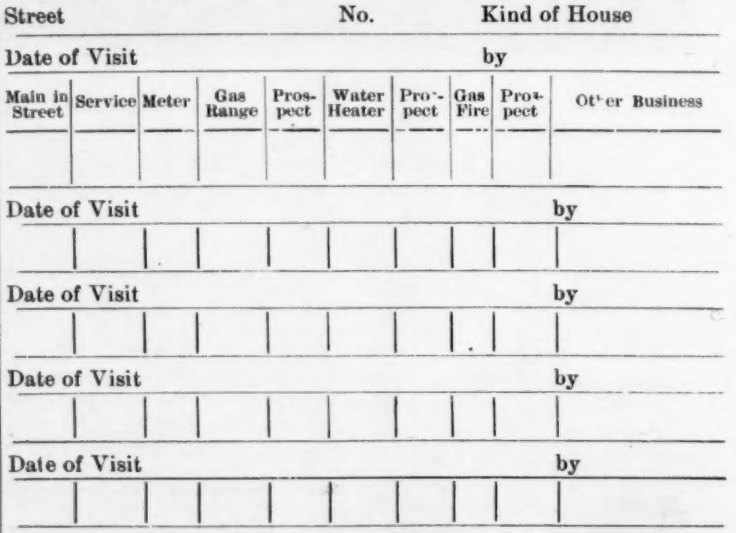
"In cooking with gas you only heat the thing you want to heat. In cooking with coal you must heat 500 pounds of cast iron in order to fry a few ounces of bacon or boil one or two eggs."

In addition to making a plea for the more general use of gas, the pamphlet serves another purpose, in that it points out and emphasizes the desire of the Company to maintain the best possible relations with the public. Troubles which arise are explained and methods of avoiding them suggested. The modus operandi of the much-maligned meter is gone into, and information showing that every precaution is taken to read the meters correctly is given. The efforts of the Company to replace streets, lawns, etc., in good condition are also dwelt upon.

The pamphlet would be a good piece of educational advertising under any conditions; but, taken in connection with the contest, which aroused unusual interest in the Company and its methods, is proving excellent material, and while direct results in the way of new business have not been traced to it, it will undoubtedly prove to have laid good foundations for this later on. In connection with the necessity of compiling exact information concerning the community as a guide for soliciting new business, the Kentucky Heating Company has just put into running order a filing system which is complete, effective and suggestive. It has been described as containing an immense volume of valuable information, arranged in a convenient way.

Every house in Louisville is represented by a card, which card contains spaces showing the location of the building, its general character, its equipment from the standpoint of the Company, and the prospects for new business which it contains. All of this is set forth on the face of the card, which carries spaces for information as to each visit paid by a representative of the Company, whose name is noted, along with remarks suggestive of business possibilities.

The most important feature of the card system, however, is the tab surmounting each one as shown in the specimen herewith. There are 15 of these, 5 being marked with letters and 10 with numerals, The letters and numerals have the following significations: Referring to rents, A, $7 or less; B, $8 to 14; C, $15 to $29; D, $40 to $59; E, $60 or more; referring to equipment, 1, main; 2, service; 3, meter; 4, range; 5, water heater; 6, grates; 7, bath heater; 8, laundry stove. Numerals 9 and 10 at present are unused, but were provided in case other contingencies develop. The method of using these tabs is interesting. If the house in point rents for $30 a month, tab D is cut off; if it has a main in front of it, is equipped with a meter and a range, and has a bath heater, tabs 1, 3, 4 and 7 are cut off.



The advantage of this is obvious. Without looking at the face of the card, it can be told, for example, whether the house has a water heater, and is or is not a prospect for that piece of equipment. This advantage is multiplied when information containing a whole street is wanted. The drawer can be opened and a glance down the line of cards will show what the character of the street is; what the proportion of ranges, water heaters, bath heaters, etc., is. Only a little familarity with the cards is necessary in order to be able to get the desired information after a moment's inspection.

The system has already proven remarkably valuable to the Company, and its operators claim that until it was installed, it was almost impossible to find out just such facts as these. The system provides a fund of information which can be drawn upon by the new business department, and contains suggestions for the sale of service and equipment which could be provided in no other way.

There is one other factor which, while not directly related to the problem of getting new business, has a bearing on it in that it must be considered in connection with retaining the old. That is keeping consumers satisfied. The Company has succeeded in its work along this line, especially in connection with gas stoves, which are without question the source of plenty of worry to the average gas company.

Realizing that, with 20,000 stoves in use, many are constantly getting out of repair or wearing out, thereby causing dissatisfaction, and realizing also that the consumer is just as likely to become dissatisfied with the service of the gas company as with the stove, the Company established a repair department in which old stoves are taken apart, repaired and rebuilt. When a stove in the hands of a consumer begins to give dissatisfaction, the Company takes it off his

hands, at a liberal allowance, installs a new (rebuilt) stove the same day, and thus establishes itself permanently in the good graces of the consumer.

This department, according to present showing, is not quite self-sustaining, regarding it solely from the standpoint of the returns from the sale of rebuilt stoves as against the cost of operating it; but, looked at from the other point of view, that of maintaining and creating good feeling toward the Company and preventing the development of dissatisfaction with the service itself, the department is regarded as a splendid investment.

The National Mine Safety Demonstration.

Thirty thousand miners are expected to attend the great National Mine Safety Demonstration, to be held in Pittsburgh, Pa., October 26 and 27, under the auspices of the Federal Bureau of Mines, the American Red Cross, the Pittsburgh Coal Operators' Association and the United Mine Workers of America.

The date, which was originally set for September 16, has been changed so that President Taft may be present on the second day, October 27, to witness a mimic mine explosion in a temporary steel gallery on Forbes' field, an exhibition of rescue work by helmeted miners following an explosion, and a review of the parade of miners.

The President, who will make an address, will present souvenir prizes to the miners taking part in the first-aid-to-the-injured and rescue work exhibitions. Walter L. Fisher, Secretary of the Interior Department, Governor Tener, of Pennsylvania, and Dr. Joseph A. Holmes, Director, Bureau of Mines, will also be present. The general arrangements for the demonstration are in charge of H. M. Wilson, Engineer-in-Charge of the Bureau of Mines.

The demonstration, the purpose of which is to teach greater safety in mining, will begin the morning of October 26, at the Experiment Station of the Bureau of Mines, 40th and Butler streets. The first day will be devoted to the interests of the mine operators, mine owners, mining engineers and superintendents of mines. There will be an explosion of coal dust in the experiment gallery and tests of mine safety lamps in gas. The dangers of electric sparks in gas and coal dust will also be shown in one of the galleries.

A class of miners will be trained in the use of the oxygen helmet which permits breathing in poisonous gases for a period of 2 hours. The oxygen helmet has proved a valuable aid in entering mines filled with fire damp following an explosion.

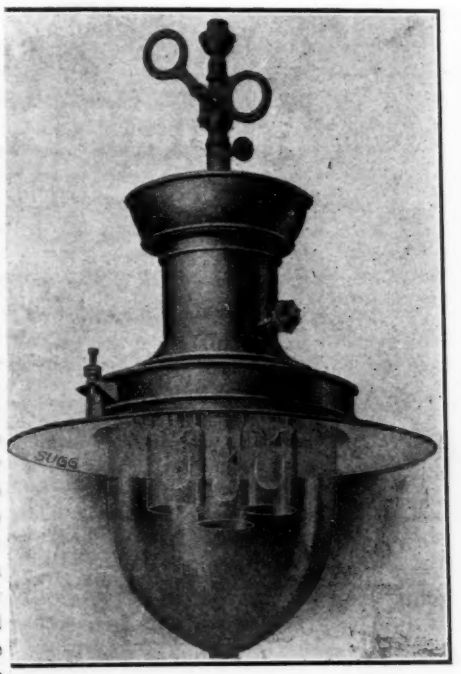
In the afternoon, the operators, engineers and superintendents will witness an actual mine explosion in the experimental mine of the Bureau at Bruceton, Pa., 12 miles from Pittsburgh. Coal dust will be allowed to accumulate in the mine, and black powder, the use of which is strongly urged against by the Bureau in mines where there are dangerous conditions, will be used. In other words, the Bureau's experts will carry out in this mine all the bad practices which they believe lead to explosions.

The next morning (October 27) the demonstration will take place on Forbes' field, the Pittsburgh baseball park, in the presence of the President of the United States and other distinguished visitors. A temporary steel gallery will be erected on the playing field and the cause of the recent great explosions in coal mines will be dramatically shown in an explosion of coal dust. Immediately following the explosion, members of one of the rescue corps of the Bureau, in their oxygen helmets, will rush into the smoke filled gallery and go through the work of rescue. Supposed victimes of the explosion will be brought forth and given first-aid-to-the-injured.

Expert rescue teams from the principal coal mines of the country will give friendly exhibitions, then the miners will pass in review of the President. The parade of the miners will continue downtown to the river front where a special pier has been assigned them to witness the marine parade in honor of the centenary of the beginning of steam navigation on the Ohio river. The miners' demonstration will conclude at noon and the remainder of the day will be taken up with the river centennial.

Sugg's New Low Pressure Lamp.

In considering the matters of high efficiency with low pressure, especially from the viewpoint of maintenance, the *Gas World* declares it seems pretty well assured that the low pressure gas lamp is going to make a strong fight to maintain its position in the outdoor lighting field against its younger competitor and near relative, the high pressure lamp. To those controversialists in public lighting questions, who advocate the employment of closely placed low power units of light, as against thinly spaced high power units, this will be good news. Such controversialists have an ally in Messrs. W. Sugg & Co., Limited, since to that well-known firm the attainment of 40 candles per cubic foot of gas is not regarded as anything wonderful. They claim that, for several years past, they have been getting 45 candles per foot with indoor, low pressure, inverted lamps, and now can supply a low pressure inverted lamp for outdoor use that gives the same high efficiency. The lamp, as the illustration shows, is symmetrical in appearance, is strongly made of double enamelled steel, and no screws are used in assembling the parts. In its design and structure every consideration has been given to insuring low maintenance costs and a long life for the lamp. The mantle used being larger than the mantle at present ordinarily employed, is possible to obtain with 2 burners a light of 500-candle power, with 3 burners 750, and with 4 burners 1,000 candles.



Glass mantle protectors are used. But while Messrs. Sugg & Co. are prepared to supply lamps so fitted, such equipping does not quite represent their ideal. They recognize that the use of a glass cylinder will improve the lighting efficiency of an inverted burner by several candles per cubic foot, but that improvement is maintained only so long as the glass protectors are thoroughly clean; but, unfortunately, these remain in a clean condition only for a short period after being put in use. To keep the lamp at its highest state of efficiency means additional expenditure on maintenance, an expenditure increased by the replacement of damaged protectors and the renewal of mantles injured by the manipulation of the protectors, and also by the greater manual work demanded when protectors are used. For these reasons, Messrs. Sugg & Co. do not believe that the increased duty secured by the glass protectors is sufficient to justify their use, and are more disposed to pin their faith to a lamp the construction of which is simplified and the maintenance costs of which are very appreciably lessened by the elimination of the mantle protector. Such a lamp they have in their well-known "Regent" type, for which is claimed the premier position in the lighting world in respect of maintenauce costs. This lamp, when fitted with large mantles, will give an efficiency within 2 or 3 candles per cubic foot of the high efficiency reached by the protector-fitted example.

The Responsibilities of Electrical Engineers in Making Appraisals.

During the progress of sessions of the last meeting of the American Institute of Electrical Engineers much of technical value was brought out, and not the least valuable of such bringing out is traceable to Mr. H. M. Byllesby, whose speech, on the topic named in the heading, was quite like that gentleman's public utterances in general. These are always forceful, logical, sequential and applicable, and while this time his utterances were altogether in connection with the electric lighting field, it is nevertheless a fact that, in the main, they are equally applicable to the gas industry. We know that this address (which has been read by many because of its widespread circulation in pamphlet form), but nevertheless we are sure that the reprinting of these two sections from it will not be without avail. The sections are:

1. *Capital Invested.*—It is probable that 34 years ago there was not to exceed $1,000,000 invested in every feature and part of this art, and to-day, taking the entire civilized world, and in the absence of statistics, I believe that several billions of dollars would be short of the amount of capital invested in manufacturing plants, in generating stations, distribution systems, water powers, trolley roads, motors

(*Continued on page* 202.)

THE AMERICAN GAS LIGHT JOURNAL

Entered at the Post Office, New York City, as Second-Class Matter.

Published weekly at 42 Pine Street, New York City.

Telephone Call, John, 2996. Cable, Am-Gas.

A. M. CALLENDER & CO., • • Proprietors.

THOMAS J. CUNNINGHAM, ELBERT P. CALLENDER, } Editors.
H. THURSTON OWENS, • Associate.

CHARLES H. WADELTON, Manager.

NEW YORK, MONDAY, SEPTEMBER 25, 1911.

[Official Notice.]

Sixth Meeting, American Gas Institute.

The Sixth Annual Meeting of the Institute will be held at St. Louis, Mo., on Wednesday, Thursday and Friday, October 18th–20th 1911.

The Headquarters will be in the Hotel Jefferson, and the meetings will be held in Memorial Hall, 19th and Locust streets.

The Committee on Arrangements has made preliminary plans for a banquet on Thursday evening, and an excursion on the river for Friday afternoon. The ladies will be entertained with an automobile ride and luncheon, Thursday noon, and a theater party on Thursday evening.

The Committee on Arrangements is composed as follows: C. L. Holman, Chairman; D. R. Russell, August Court, C. H. Quackenbush, A. C. Einstein, T. D. Miller, John Dell, C. H. Dickey, R. B. Hatton, R. A. Walsh, E. A. Downey, E. H. Boehnken.

Hotel Rates.

Hotel.	Single Room. Without Bath.	Single Room. With Bath.	Double Room. Without Bath.	Double Room. With Bath.
Jefferson...	$1.50 day and up.	$2.50 day and up.	$2.50 day and up.	$3.00 day and up.
Southern...	$1.00 day and up.	$2.50 day and up.	$1.00 day and up.	$2.50 day and up.
Maryland..	$1.50 day.	$2.00 and $2.50 day.	$2.00 and $2.50 day.	$3, $3.50 and $4 day.
American..		$1.50 day and up.		$2.50 day and up.
Planters....	$1.50 and $2.00 day.	$2.50 day.	$1.50 day and up.	$2.00 day and up.
Marquette..	$1.00 and $1.50 day.	$2, $3 and $3.50.	$1 each.	$1.50 each.

Hotel.	Rooms with 2 Beds, Without Bath. 2 People.	Rooms with 2 Beds, Without Bath. 3 or 4 People.	Rooms with 2 Beds. With Bath. 2 People.	Rooms with 2 Beds. With Bath. More than 2
Maryland..	$3.00 day.	$4.00 day.	$4.00 day.	$1 each for all over two.

Transportation.

Railroad Rates.—It will be impossible to secure convention rates on the certificate plan for this meeting, as the Passenger Associations have raised the minimum attendance for securing such rates to 1,000. But in many cases excursion tickets and mileage books can be used to advantage.

The Chairman of the Technical Committee announces the following papers to be read at the meeting:

"Intensive Scrubbing and Condensing of Gas," by L. E. Worthing, Detroit, Mich.

"The Manufacture of Illuminating Gas in By-Product Ovens in the United States," by W. S. Blauvelt, Semet-Solvay Company, Detroit, Mich.

"Report on Verticals at Providence, R. I.," by Carroll Miller, Providence, R. I.

"Report on Verticals at Manchester, N. H.," by W. G. Africa, Manchester, N. H.

"Turbo-Blower," by an Engineer with the General Electric Company.

"Production and Market for Sulphate of Ammonia," by an Engineer with the New England Gas and Coke Company, Boston, Mass.

"Tar Distillation and Market for Its By-Products," by Alan D. Whittaker, Atlanta, Ga.

"Actual Leakage in Unaccounted for Gas," by J. D. von Maur, St. Louis, Mo.

"District Holders and Their Place in a Distribution System," by R. M. Griswold, Denver, Col.

"Flow of Gas in Mains," by J. W. Battin, Detroit, Mich.

"U. S. Government Report on Electrolysis," by S. W. Stratton, Bureau of Standards, Washington, D. C.

"Pacific Coast Conditions," by John A. Britton, San Francisco, Cal.

"Photometric Work," by C. O. Bond, Philadelphia, Pa.

"Cost and Results Obtained from Automobile Delivery," by L. R. Dutton, Wyncote, Pa.

"Valuation of Public Utilities," by H. C. Abell, New York city.

There will also be some interesting Committee Reports, and the Report of the Editors of the Wrinkle Department and Bureau of Information. It is possible that arrangements may be made for a Lecture on "Some Recent Developments in Gaseous Combustion."

At a regular meeting of the Board of Directors, held August 19th, 1911, the following gentlemen were elected as the Nominating Committee: C. H. Nettleton, Chairman; Jas. H. Jourdan, W. H. Gartley, James Ferrier and J. H. Eustace.

In case of inability to serve, the following gentlemen were named as alternatives: J. A. Britton, T. C. Jones, C. M. Cohn, J. D. von Maur and H. M. Moore.

A. B. Beadle, Secretary.

[Special Editorial Correspondence by Telegraph.]

TWENTIETH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

Hotel Pontchartrain, Detroit, Mich., Sept. 20, 1911.

Dear Journal.—The first day's sessions of the Michigan Gas Association have been closed, as per formal resolution of adjournment, and the record of the work was like this: Early arrivals this morning as they stepped from the steam road stations were nonplussed for the moment. None of the usual swift moving surface cars were to be seen, but that lacking was hardly noticed ere one heard and knew that the employees of the Detroit United Railways surface system were on strike and the great city beheld thousands of its toilers marching on foot to the scenes of their labors. The irrepressible and only "Jim" Lynn found a ready reason for this stoppage, the reason being that, knowing the Michigan Association's reputation for keeping its members in line during the hours of meeting, and remembering that the two last conventions were held while boat travelling over the wondrous lakes, which was conducive to strict attendance during the technical times of the meeting, the street car men determined to do their parts towards keeping the delegates in the convention room. Be that as it may, the executives were well rewarded by a splendid attendance when President Ewing announced the opening of the regular order, and the President's spryness was in odd contrast to the quietude of Secretary Chamberlain, whose usual way is that of one well equipped with nerves of the certainly active sort. Alack for "Glenn R.," who was nursing a foot and an ankle that had been put away through a stepping mishap. However, his mentality was in its usual active high state, and he went through his official paces quite like a thoroughbred without blemish. The weather was perfect, the attendance was representative and the meeting place, "The Banquet Hall" of the handsome hotel Pontchartrain, everything that could be desired. The Mayor being busy with the strikers, a formal welcome was omitted, so without adoo the regular order was taken up. This included the report of the Executive Committee as to various matters of routine, the several items nicely showing that the Association was prospering from every material point. One proof which the Association has of its hold on the gas men of Michigan was nicely afforded in the membership gains, which equalled 29. That is, the rolls were increased by the placing thereon of 55 additional names, while 26 were taken therefrom through resignations and the like; it is further notable that the new memberships were to all intent equally divided as between Active and Associate, 28 going to the former and 27 to the latter. Some other routine business intervened on the finishing of which Vice-President Blowers assumed the chair and President Ewing delivered his inaugural message. The address was well out of line in matter from any heretofore made to the Michigan Association, in that Mr. Ewing confined himself practically through its length, and it was by no means scant as to paragraphs, to the considering of a plan whereby the Association initiates a system of advertising gas, as to its place in modern domestic and business economy, that could eventually be used to advantage not only in Michigan but in every other State of the Union as well through the connected effort of the several Associations. The reading of the message was carefully followed, and that its ideas, radically new as they were, harmonized with the sentiment of his hearers, seemed proved by the applause which greeted him as he finished. Another innovation here occurred. The address, instead of being referred to a committee for consideration and report, in accordance with custom, was laid on the table, and the paper by Mr. C. A. Brownell, entitled "Advertising: a Brief," was read, then both address and paper were jointly discussed. It was unfortunate that Mr. Brownell was not present, but his absence did not prevent a spirited discussion. This terminated in the adoption of a resolution, offered by Mr. Morgans, authorizing the forming of a committee to consider the matter in all its phases, said committee to be appointed by Mr. Ewing, they to report their findings in the premises at the meeting next year. This brought the morning session to a close. The afternoon session was commenced by the reading of a paper "On the Function of Tar in the Condensation of Coal Gas," the joint production of Prof. A. H. White, of the University of Michigan, and Mr. R. S. Tour, the holder for the current year of the Michigan Gas Scholarship in the University. It is a pleasure to note the continued good work that is being done in this instance, through and by the University Scholarship, and no matter what the meed of praise that is to go to the Association, to the University and to the holder, it is an assured certainty that a large percentage of the good accruing from this on all sides, is directly traceable to the painstaking work of Prof.

White, the paper which was in the accusative rather than in the vocative, brought out a good discussion, a noteworthy participant therein being Mr. Blauvelt, of the Semet Solvay Company. The two succeeding papers, respectively on, "The Use of Reinforced Concrete in Gas Works," by Mr. H. W. Douglas, and "A Semi-Concrete Condenser House at Adrian, Mich.," by Mr. E. F. Floyd, were read and jointly discussed. The concluding number for the afternoon was the paper by Mr. A. G. Schroeder, whose pertinent assembling had to do with "A Purchasing System for a Gas Company." The balance of the afternoon was spent in automobile touring, in separate parties, each group selecting their own route and way. And never did this beautiful city look better than it did this lovely autumn afternoon. He who would fully appreciate Detroit as it is—the housing place of half a million people—with its brisk and attractive wholesale and retail marts, with its broad acreages of land covered with modern structures given over to vast manufacturing outputs, and with its great examples of the homes of the wealthy, should have travelled over Detroit's masterpieces of roadway as your correspondent travelled to-day.—C.

DETROIT, September 21, 1911.

Dear JOURNAL: The car men's strike is at an end and the city has resumed its wonted aspect. Arbitration won the day. The second day's proceedings were opened with the paper by Mr. B. M. Ferguson, who presented a forceful example of an "Application of the Taylor System of Shop Management to Gas Works," Truly Mr. Ferguson's tryout of the plan will certainly lead to its extension to other divisions of the Company's doings. The discussion was a good one, and quite pertinent therein was Mr. Dewey's suggestion that the plan would work out all the better, if not too much of accomplishing were tried at once. Put in a pin right there. "Then we were photographed," the explosive system being the plan followed. The morning session was brought to an end with Mr. Howard Lyon's presentation of the subject of "Filament Ignition of Gas." This was really a lecture rather than a paper. It held the close attention of the Association, and Mr. Lyon's prediction that filament ignition, at once simple, easy of application and dependable, was close at hand, was greeted with applause. The afternoon session—which cleared up all routine matters—was commenced on time. The opening number was a convincing paper, by Mr. W. F. Clausen, on the "Development of the Hotel Gas Appliance Business." His subject was treated in concise fashion, and the discussion was brisk and useful. The paper giving "Directions for the Recovery, Concentration and Testing of Ammonia," by Mr. James A. Brown, was, at the author's suggestion, taken as read, with the injunction by President Ewing that its figures were well worth conning at home. The Committee on Place of Next Meeting submitted a tentative finding, which led to a brisk dialogue and the determination to relegate the matter to the Executive Committee to report at their convenience, with a suggestion, however, that, if it were possible, a boat trip should be provided for. The Nominating Committee then handed in the following list of office bearers for the ensuing year:

For President—Mr. Frank W. Blowers, Kalamazoo.
For Vice-President—Mr. W. S. Blauvelt, Detroit.
For Secretary and Treasurer—Mr. Glenn R. Chamberlain, Grand Rapids.

Of course, the report was concurred in and the gentlemen named were elected, and Messrs Blowers and Blauvelt responded in royal fashion, through acknowledging their elavation. Of course, in the lame man's case, it was a sure thing. Three new members were then taken into the fold. The President next announced that he had selected as associates on the Publicity Committee Messrs. H. W. Douglas and J. A. Cleveland, with intent of adding others later on. As to the report of the Committee on Standardizing the Printing of Proceedings, it was determined to authorize the Secretary to act in conjunction with the Secretaries of the other Associations. The usual votes of thanks were passed and the sessions were declared at an end. The social features of the entertainment programme were nicely carried out. Automobile rides without number, seats to the various places of entertainment, and visits to and through numbers of the great manufacturing places are being thoroughly enjoyed. The main treat though for Friday is an inspection of the Railway Company's tunnel under the river, which is to be done by and through the courtesy of the Company's engineers and the local Engineering Club.—C.

Proposed Rules for Testing Gas Meters in New Jersey.

The Public Utilities Commissioners, of New Jersey, held a hearing, on Tuesday, the 19th, at the State House, Trenton, for the consideration of the rules that are proposed to govern the testing of gas meters in New Jersey. The rules were discussed, paragraph by paragraph, by representatives of the various gas companies, and several modification were proposed which will likely be concurred in. The revised regulations will then be officially published, as set and submitted to the companies before going into effect. The rules as originally proposed are appended:

Rule 1.—A meter may be considered correct if, when passing gas at the rate of 6 cubic feet per hour, per light capacity, it shows, in comparison with a standard gas prover, an error which is not greater than 2 per cent.

Rule 2.—No gas company shall allow a gas meter to remain in service for a period longer than 4 years without checking it for accuracy and readjusting it if found to be inaccurate.

Rule 3.—Each company shall keep a record of tests made on meters before installation and upon receiving them from the services. The original of such record shall be kept in the meter shop, and available for examination at any time by the inspectors of the Board. A report shall be made up from such record book and sent to the office of the Board at stated periods. Each company having over 500 meters shall report monthly; each company having less than 500 meters shall report quarterly. Blank forms will be furnished by the Board on which reports are to be made.

Rule 4.—Each gas company shall provide itself with equipment necessary for testing meters, such equipment to consist of a standard meter prover with suitable accessories. Each prover will be inspected by the Board and furnished with an inspection tag or plate. After January 1st, 1912, tests made with an uncertified prover shall not be deemed authoritative. Provers are to be shipped to Stevens Institute, Hoboken, N. J., for certification, and as the entire work will cover a period of 3 months, each company will be notified of the proper time to ship each prover, in order that they may be returned without delay.

Rule 5.—Each gas company shall, without charge, make a test of the accuracy of a meter upon request of a consumer, provided such consumer does not make a request for test more frequently than once in 6 months. A report giving the results of such tests shall be made to the consumer, and a complete record of such tests shall be kept on file in the office of the company.

Rule 6.—Upon formal application by any customer to the Board of Public Utility Commissioners, a test shall be made upon the consumer's meter by an inspector employed by the Board, such test to be made as soon as practicable after receipt of the application. For such test a fee of $1 shall be paid by the consumer making application for the test if the meter is found to be slow or correct within the allowable limits, and by the company owning the meter if the meter is found to be fast beyond the allowable limit. Each meter to be so tested is to be removed and sent by the company owning the same to Stevens Institute, Hoboken, N. J., for test.

Rule 7.—Meter dials shall read directly in cubic feet of gas, and bills rendered periodically by the company shall designate the readings of the meter at the beginning and end of the time for which the bill is rendered, and give the dates at which the readings were taken; bills shall also show the gross amount charged and the net amount after deducting any rebate, if any, allowed for prompt payment. Where prepayment meters are in use, the meter reader, at the time of reading same, shall leave with the customer a slip showing the reading as well as the amount of money which has been collected from the meter.

Rule 8.—No company shall make any charge for changing a meter found defective or where test is to be made; and no charge shall be made for changing a meter of one type for a meter of another type unless the first meter referred to has been in use less than 1 year, in which case a charge may be made to cover the actnal expense of making the change.

Rule 9.—The company furnishing gas which, within a 1-mile radius from the distribution center, gives a monthly average total heating value of not less than 600 B.T.U., with a minimum which shall never fall below 550 B.T.U., may be considered as giving adequate service as far as the heating value of the gas is concerned.

Rule 10.—Each gas company whose output exceeds 20,000,000 cubic feet a year shall equip itself with a standard calorimeter outfit, with which periodic tests upon the gas shall be made. A record of these tests shall be made and kept open for public inspection.

Rule 11.—Gas pressure, as measured at meter inlets, shall never be less than 2 inches nor more than 6 inches of water pressure; and the daily variation of pressure at the inlet of any one meter on the system shall never be greater than 100 per cent. of the minimum pressure.

Rule 12.—Each company shall make frequent measurements of the pressure and pressure variations, and these shall be kept on record and open for public inspection.

Rule 13.—In no case shall the gas contain more than 30 grains of total sulphur per 100 cubic feet, and not more than a trace of sulphur as sulphuretted hydrogen.

Rule 14.—Each company shall keep a record of complaints, which shall include the name and address of the consumer, the date, the nature of the complaint, and the remedy. A classified summary of these records shall be submitted to the Board on or before the 28th day of each month, for the preceding month, on blank forms to be furnished by the Board.

Rule 15.—Each company supplying gas shall specifically inform each of its customers as to the conditions under which efficient and satisfactory service may be secured from its system.

Rule 16.—Each company supplying gas shall adopt some method to inform its customers as to the reading of meters, either by printing on bills a description of the method of reading meters or a notice to the effect that the methods will be readily explained on application. It is recommended that an exhibition meter be kept on display in each commercial office maintained by a gas company.

(*Continued from page* 199.)

and subsidiary details employed in the business which has been produced by electrical engineers and the promoter and capitalist working hand in hand and together during approximately a generation.

2. *Credit Due Capitalist.*—I think we should seriously consider this fact; that we should give to the promoter, to the capitalist, to the man who is able to influence capital and to place it at the disposal of the men of our profession, the credit that is properly due him. The achievement of the electrical engineer would not have been possible if it had not been for the presence of the man with money, who believed in the commercial possibilities of our art as from time to time developed and who produced the capital with which to continue the development of that art. I am entirely confident, although it is a matter purely of conjecture and not susceptible of direct proof, that inventions as great as any which have revolulutionized the world have died, have never been heard from because the much abused capitalist was not on hand to stand behind the inventor during his period of discouragement and disaster. I believe many other worthy inventions and developments have attracted no great notice, have not accomplished their destiny, because of the absence of the man or corporation with both faith in the invention and the means of producing the capital to develop it.

Our profession has indeed been fortunate in having had associated with it from its inception men who were sufficiently intelligent, courageous and far sighted to see the merit of the inventions and developments which from time to time were produced and who had withal the faith and the ability to continue to stand behind these inventions and developments with their capital during that period which we all know has taken place, when these inventions and these developments were under criticism, temporary failure and while only disappointing results were being reached. During this period of disappointment, of hazard, during this period of modifications from the original plans and disappointments and changes, the man or corporation with money was present to tide the infant invention or industry over the shoals and hazards which surrounded it, and except for the presence of men of the type of which I am speaking, with their courage, their faith and their capital, many of the inventions and developments of our profession would have been buried in the grave of permanently disappointed hopes and non-fulfilment.

To-day our art is developed. The products of the brains of the electrical engineer are so well known, their commercial utility is so thoroughly established, particularly in the principal lines of our achievements, as to lead us to be forgetful perhaps of that period which the older ones of us recollect so clearly. This period, due partly to the crudity of our own devices and the undeveloped condition of our own inventions, due partly to the unstable condition of the collateral features upon which we depended, such as steam engines, boilers, water wheels and manufactured articles, was a period attended with heart-breaking anxieties, not only to the inventor and engineer, but do not forget that it was also a period of heart-breaking anxieties and disappointment to the man who had invested his capital in those things.

As I look back over the sweep of 30 to 34 years, and from the standpoint of maturity which comes with middle age and long experience, it is a continuing marvel to me that in spite of the perpetual disappointments and the hazards pertaining to this business, capital was found to proceed with the development of the art, and in all fairness, as I look back over this period, the admiration I feel for the inventor and the engineer, the pride I take in their achievements is, in my own mind, shared with the courage and faith and enterprise of the men of capital who stood by us and our operations during those trying times.

The Function of Tar in the Condensation of Coal Gas.

[Prepared for the Twentieth Meeting, Michigan Gas Association, by Prof. ALFRED H. WHITE and P. S. TOUR,[1] Ann Arbor.)

The traditional method of condensing coal gas is to cool it slowly and gradually during the later stages, allowing what tar and liquor will, to separate in the condensers and removing the remainder by frictional tar separators or scrubbers of one sort or another. In this process the minute particles of tar-fog grow, by accretion during cooling or by collision with one another, until they become large enough to be readily removed by mechanical means. The plan is undoubtedly the simplest which a young industry could devise, and its long retention proves its practical success.

1. Mr. Tour is the holder of the Michigan Gas Association Fellowship, in Gas Engineering for term of 1910-11.

At the temperature of 300-400°F., prevailing at the top of the standpipe only, the least volatile portions of the tar are in the liquid form and all the water is in the form of steam. The gases cool rapidly, and within a few seconds after they leave the retort, especially where they bubble through the water of a hydraulic main, they are reduced well below 200°F., and much of the water has separated in the form of mist. It has required perhaps 8 seconds to make this drop from the 1,400°F. temperature of the gas in the retort to the 200° temperature of the hydraulic main. The remaining 100° drop to the the tar separator is made gently and cautiously in 1 or 2 minntes. Why is it necessary or desirable that this last cooling should be so slow? Is it to enable the gas to get into equilibrium with the suspended tar at the lower temperature? Does it attain such equilibrium and is it advantageous that it should?

The Condensation Process.—Ideal condensation requires the complete removal from the gas of all suspended particles, but the retention by the gas of all the valuable constituents which it can retain as vapors in the distributing system. This broad statement can, in practice, be narrowed to the usually accepted one that all the tar, naphthaline, and ammonia liquor must be removed, but that as large a proportion as possible of benzol should be retained.

In papers presented to your Association several years ago, as the result of investigations made by the holders of your fellowships, it was shown that the elimination of naphthaline was effected largely by the tar which, under proper temperature conditions and with sufficient time of contact, was capable of dissolving practically all the naphthaliene. This statement was vigorously controverted by some authorities at the time, but it is, we believe, very generally accepted now. Since the elimination of naphthaline (which is desired) is effected mainly by the tar, and the elimination of benzol (which is deplored) is effected mainly by the same material, the discussion of the condensing process must center largely in the relation of tar to these constituents under the conditions prevailing in the condensing system.

Tar is in part a mixture and in part a solution of many complex substances, but it will be sufficient for our present purpose to consider it as composed of non-volatile tar, naphthaline and benzol, these substances being representative of the classes which are import- and in this connection. The non-volatile tar, although composed of many complex materials, behaves substantially as a single substance, liquid, non-volatile, and capable of dissolving naphthaline and benzol. The ammonia liquor requires only slight mention. as it does not materially change the equilibrium existing between the tar and the gases. It may, by coating the tar globules, check the rate of reaction between the tar fog and the vapors and so require a longer time of contact for attainment of equilibrium between the gas and the tar.

It is worth while to carefully consider the consequences which would necessarily result if, on the one hand, equilibrium were attained and, on the other hand, if it were not attained.

Equilibrium Between Gas and Tar.—If the removal of naphthaline and benzol were simply due to cooling, the gas would arrive at the tar separator saturated with naphthaline but not saturated with benzol, for there is not a sufficient amount of the latter. Since, however, the condensed, non-volatile tar is capable of dissolving both benzol and naphthaline, if sufficient time has been allowed, there will be a definite equilibrium between the amount of benzol and naphthaline dissolved in the air and remaining in the gas. The gas, after the tar is separated, will not be saturated either with naphthaline or benzol.

If the tar had come to equilibrium with the gas before the tar was separated, neither the gas nor tar should change if again brought into contact with one another at the temperature of equilibrium. It should, therefore, be experimentally possible to determine whether or not equilibrium had been attained by bubbling purified gas through tar at various temperatures. If equilibrium had been attained a temperature should be found at which the gas and tar should be absolutely unchanged.

If this equilibrium point should be found, and then the gas and tar should be brought to equilibrium at a higher temperature, some of the lighter constituents of the tar, such as benzol and naphthaline, would be vaporized and pass into the gas. In again cooling the gas out of contact with the tar, there would probably be sufficient light oil to keep the naphthaline in liquid form, and possibly part of the benzol would remain with the gas and enrich it. There might, therefore, be a possibility of enriching the gas by scrubbing it with its own tar at the proper temperature.

If equilibrium had not been attained in the condensers the result of

tar scrubbing could not be foretold, except to this extent: If the gas coming to the separator was, for instance, only 50 per cent. saturated with naphthaline, and still equilibrium had not been reached, there would be still less naphthaline in the gas. Therefore, there should not be naphthaline trouble in any case if the gas and tar were brought together again at the tempareture of the tar seperator.

If tar scrubbing were successful it should be possible to cool the gas at any rate and, in any way desired, mechanically remove the tar in a separator, then scrub the gas again with its own tar, removing completely even the finest particles of tarfog and possibly improving the gas.

Experiments with Tar as a Scrubbing Agent.—The general method of experimenting was to place a known weight of tar in a series of bottles in a water or air bath. Purified coal gas was passed through a meter, bubbled through the tar at the desired temperature, and passed through glass condensers to a gasholder, from which it was subsequently taken for test. A plug of glass wool at the cool end of the condenser served as a support on which crystallized naphthaline or oily deposits separated. Successive portions of gas were passed through the same tar and tested until it was evident that equilibrium was being attained.

Tests A, B, C, of Table I., form one series of tests divisible into 3 parts. The tar in this case was from a charge of 400 pounds of Pittsburgh coal, distilled in the experimental plant at moderate heat. It was an average sample of all of the tar produced. Test A was made by passing successive portions of gas through the same sample of tar at 167° F. It will be seen that treatment with the tar impoverished the gas in every case, the greatest drop of 42 B.T.U.'s and 3.3 candles being with the first tank of gas. The impoverishment became less with each succeeding tank, until finally the fourth tank showed practically no change. In fact, the heat value showed a slight gain which, however, is probably to be attributed to experimental error. The average result for 20 feet of gas (the approximate amount produced with 100 grams of tar) was a decrease of 31.1 B.T.U.'s and 1.1 candles per cubic foot. The gas was evidently not in equilibrium with the tar at that temperature, and was made poorer by being brought into equilibrium at the high temperature and then cooled to its initial temperature.

Tests B and C on new samples of the same tar at 212° F. gave a similar result, although neither the illuminating nor heat values were so seriously impaired.

Test J, on a similar tar at 300° F., showed a slight gain in the heat value of the first portion of gas treated, and practically no change in the subsequent samples. Only slight traces of naphthalene were deposited. The gas shows a slight improvement after this treatment, but it is believed that had it been cooled after scrubbing as low as it would normally be in winter that the slight gain would have disappeared. These tests had been made on an average sample of the whole tar. Experiments were now made on hydraulic main tar (tests D and E) and on separator tar (tests F and G). In each case the tests were made with the tar at the temperature of boiling water, and as in the previous case the result is an impoverishment of the gas. No naphthaline separated out of the condensers on tests D and E, even though four times as much gas as would normally accompany the amount of tar, was passed through, for hydraulic main tars are low in napthaline and retain tenaciously what they have. With separator tar the gas was impoverished as previously, but, in addition, naphthaline stoppages made themselves evident before over half the normal amount of gas had bubbled through the tar.

If any tar in a gas works should have attained equilibrium with the gas it is that which is carried past the tar separator and which separates between the separator and the final condenser. A sample of tar from this source, test H of Table I., abstracted from the gas 22 B.T.U.'s, the first time gas was bubbled through it at 88° F., and to B.T.U.'s the second time the same tar was used. It appears, therefore, that in ordinary works' practice the tar is separated before it has come into equiltbrium with the tar.

The tars which had been used to scrub the gas at ordinary temperature changed in consistency only slightly. Those used at higher temperatures became thick and viscous, so that they would scarcely flow when cold and resembled the prepared tar used for street paving. The water of the tar had, of course, been completely removed by the scrubbing, as had also some of the lighter oils, which, however, had separated in the condensers and dragged down enough of the illuminants with them to depreciate the gas.

Variation in Tar During Carbonization.—If tar is to be used as a scrubbing agent for gas its temperature should apparently be that at which it is most nearly in equilibrium with the gas, so that any unfavorable change in candle power will be minimized. How impossible it is to find a single most favorable temperature is shown by a series of analyses of tar and gas produced during successive half-hour intervals of the carbonization process. The salient points are given in Table II.

TABLE I.—*Results of Scrubbing Gas With Tar.*—Each letter denotes a new sample of tar: A, B & C, mixed tar from one charge of Pittsburgh coal. D. E, Hydraulic main tar from Ann Arbor Gas works. F. G, Separator tar from Ann Arbor gas works. H, drip tar collected between tar separator and final scrubber, Ann Arbor gas works. J, mixed tar from one charge of same coal as A, B, C.

Test No	Grams Tar Used.	Cu Ft. Gas.	Temp. of Scrubbing. Degs. F.	B.T.U. in Gas. Before.	B.T.U. in Gas. After.	B.T.U. in Gas. Change.	Candle Power Before.	Candle Power After.	Candle Power Change.
A1	100	6	167	625	583	—42	16.6	13 3	—3.3
A2		7	167	621	582	—39	16.3	16.1	— .2
A3		6	167	619	606	—13	16.3	16.2	— .1
A4		6	167	611	615	+ 4	16.8	16.6	— .2
B1	100	6	148	621	595	—26	16.7	16.0	— .3
B2		5	215	621	597	—24	16.7	16.0	— .7
C1	100	3	216	623	610	—13	17.1	17.1	— .1
C2		4	208	623	612	—11	17.1	16.4	— .7
C3		4	212	023	014	— 9	17.1	16.4	— .7
C4		5	215	623	617	— 6	17.1	16.2	— .9
D1	125	6.3	212	592	572	—20			
D2		4.5		590	lost	?			
D3		7.2		607	614	+ 7			
D4		5.6		595	602	+ 7			
D5		4.8		597	594	— 3			
D6		5.0		606	602	— 4			
D7		4.0		603	lost	?			
D8		4.1		601	600	— 1			
D9		5.0		604	601	— 3			
E1	130	1.9	212	606	564	—42			
E2		3.1		623	578	—45			
E3		4.0		631	624	— 7			
E4		5.2		644	651	+ 7			
E5		5.1		695	613	— 2			
F1	75	5.1	212	602	580	—22			
F2		5.8		603	593	—10			
G1	105	5.2	212	614	600	—14			
G2		5.3		614	612	— 2			
H1	130	5.7	88	618	596	—22			
H2		6.2		618	608	—10			
J1	110	5.1	300	599	620	+21			
J2		5.2		599	599	0			
J3		5.0		602	608	+ 6			

TABLE II.

Half-Hour Period.	Pr. Ct. Crude Naphthaline. Condensed Tar.	Pr. Ct. Crude Naphthaline. P. & A. Separator Tar.	Pr. Ct. Light Oil. Condensor Tar.	Pr. Ct. Light Oil. Separator Tar.	Pr. Ct. Benzol in Purified Gas.
1	0.8*	0.1	3.6	3.6	3.4
2	0.2	0.2	2.0	3.1	3.0
3	1 3	0.6	3.2	4.5	2.0
4	1.4	2.5	3.4	4.2	1.4
5	3.2	...	2.9	...	0.8
6	5.6	3.2	1.7	0.5	0.7

*This figure is probably high because of the tar left in the condenser from the latter part of the previous run.

The increase of crude naphthaline, in both the condenser and separator tar at the latter part of the run, is striking. The light oils in the tars decrease in the same direction as do also the benzol vapors in the purified gas. The tar of the first period tended, of course, to come into equilibrium with the rich gas evolved at the same time, and the high naphthaline tar of the last period tended to come to equilibrium with the lean gas evolved with it. The desirable temperature for scrubbing the gas made in the first part of the run will not be the same as for that made in the last part.

The experiments indicate that it will not usually be advantageous to attempt any process involving the use of a hot tar scrubber, unless it is feasible, as is done with some of the by-product coke ovens, to separate the rich and poor gas and the rich and poor tar. It should apparently be feasible to improve the quality of the poor gas by scrubbing with the rich tar.

Is Rapid Cooling Desirable.—What is the use of slow cooling from 200°–100° F.? Would it not be better to do away with the cumbersome air condensers and substitute more compact water-cooled condensers, washer-scrubbers or similar machines?

Would the candle power or heat valve or the gas be injured by rapid cooling? The answer is quite certain that they would not. The more benzol retained in the gas the better. The quicker the tar is removed from the gas, and the higher the temperature at which it is removed, the better will be the candle power and heat value of the gas.

Would it be possible to completely remove the tar fog from quickly cooled gas by mechanical means? It would certainly be more difficult. The particles of tar grow by accretion and union with one another in the slow cooling process so that their mechanical removal becomes easier. Any system of rapid cooling would almost certainly require an oil scrubber to remove the last portions of suspended naphthaline and tar, and even with this there might be difficulty, for the experience of other industries has shown that it is almost impossible to remove from a gas small amounts of very finely divided solids. It is possible that the Cottrell electric process, which has proven itself so successful with smelter fumes, might be applied here also.

The answer to the question is, therefore, apparently that rapid cooling of the gas is only for large works which can afford oil scrubbers and the expert attention required for their proper control.

Conclusions.—Rapid cooling of the gas should improve its candle power and heat value, because of the lessened opportunity which the tar has to abstract benzol from the gas. The only apparent valid objection to the rapid cooling of the gas is the difficulty of mechanically removing the last traces of suspended tar which is finely divided because of the quick cooling, and of removing the napthaline which the tar has not had opportunity to dissolve. This may be accomplished by the use of oil scrubbers, but the process requires skilled supervision to prevent a change in the candle power of the gas.

It was hoped that it might be possible to use tar at a suitable temperature, instead of a special oil in the scrubbers, on the theory that, if the tar had been in equilibrium with the gas before its separation, neither one could be affected by being brought back in contact with one another at the same temperature at which they were separated. Experiment failed to confirm this theory, the gas losing both in heat value and candle power, under every condition tested, and in most conditions naphthaline stoppages resulting.

In the ideal condensing system the tar would be separated from the gas the moment it had cooled sufficiently to dissolve all the naphthaline, and while it had a minimum of benzol, but this ideal temperature changes continuously as the distillation of the charge progresses and it is evidently impossible to do more than fix an approximately most desirable average temperature which will vary for each individual works.

The gas must also remain in contact with the tar a sufficient time to allow the naphthaline to be dissolved by the tar fog. This time will be longer the lower the temperature. If the condensation is very rapidly effected the removal of the napthaline will be due to the cooling effect and not to the tar which will not have had time to act. The gas will, therefore, after separation of the tar, be saturated with naphthaline which will have to be removed by special napthaline scrubbers.

The small works which does not desire to install naphthaline scrubbers, and which relies on the tar to remove the napthaline, will not dare to cut down the time for condensing nor to remove the tar at too high a temperature. It is to be remembered that with the ordinary process of condensation more than 95 per cent. of the naphthaline is removed by the tar and that this high removal is accompanied by a loss of less than 10 per cent. of the benzol with the tar. The efficiency of the present process, is, therefore, already very high as to elimination of naphthaline in the tar and retention of benzol in the gas. The only advantage of a change for small works where air condensers act satisfactorily and with little attention would lie in the gain of a portion of the 10 per cent. of benzol now lost in the tar. This saving would appreciably affect the candle power of the gas but would hardly raise its heating value over 1 per cent. It would hardly justify a great expenditure of time or trouble to attain it. The traditional method of condensation of coal gas seems still the best for the small plant.

THE coal gas bench equipment of the Danville (Ills.) Street Railway Company have been completed, and the proprietors promise that if the present rate of gain in consumption is kept up for a twelvemonth the selling price will be $1 per 1,000, instead of $1.12½, as now.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, September 10, 1911.

Forty-two Candles per Cubic Foot.—Gas Works in the Hot Weather.—Coal Prices in 2100 A.D.

Evidently the limits of intrinsic illuminating value contained in 1 cubic foot of ordinary 15-candle coal gas have not yet been touched upon. Gas engineers who are well on in life recall the time when an advance in duty from 3 to 6 candles per cubic foot consumed per hour was hailed as a grand invention, and a later period when, by the aid of the Welsbach mantle, a duty of 15 candles was claimed. Since that epoch there has been no standing still. We have seen the duty increased, by one improvement after another, to 20, 25 and even 30 candles per cubic foot. It will be understood that we are considering the possibilities of the ordinary or low pressure supply, and not regarding for the moment the increase obtainable by high pressure systems.

In passing, we may remark that the duty afforded by any low pressure burner can practically be doubled with the assistance of a compressing pump. But now the New Inverted Incandescent Gas Lamp Company, of London, who have already taken a prominent position as manufacturers of high class lighting appliances, have placed on the market a lamp containing either two, three or four inverted burners, consuming 6 cubic feet per hour, and giving a light equivalent to 250 candles per burner. The mantles used are a special size, larger both in the matter of diameter and length than the ordinary size inverted mantle. A 4-burner lamp, using 24 cubic feet per hour, about 0.75d, worth of gas, will give a lighting effect equal to 1,000 candles, and being noiseless, they are equally applicable to interior and exterior lighting. The makers have directed their practical experiences to the provision of proper facilities for adjustment, cleaning and maintaining, points which specially appeal to gas engineers, who are well advised if they retain control of the lamp. Nothing is more annoying, or likely to injure the prospects of increased business, than to go round the district and see lights badly regulated or burners choked with dust. If the lamp is not going to be so maintained as to be a credit to gas and the gas company, it had far better be left unfixed. Space does not admit a further reference to this lamp, of the existence of which I was quite ignorant when writing on the possibilities of increasing duty from incandescent burners last month. But it will be remembered as a curious coincidence that attention was directed to the fact that a moderate preheating of the gas and air, only 100°, might be expected to increase the duty 30 per cent. This is exactly what the New Inverted Company have now done, and their enterprise and ability means more lighting business for the ensuing season.

We have been, or rather, are experiencing an unusually hot summer, for the thermometer stands about 90° in the shade to-day. A continual blaze of sunshine, week after week, is a thing that we don't have once in 20 years, and it is not without its effects on health, comfort and business. The sales of gas have increased 10 per cent., and this is due to its extended use for cooking, particularly among the slot meter users. No one, having gas at command, will undergo the discomforts incidental to a coal fire in a small apartment, during tropical weather. Strange to say, sales of coke have been well maintained, and stocks are low. The dry season may also have something to do with the excellent condition of the demand for sulphate of ammonia, which is most unusual at this period of the year. The hot weather has also brought its troubles, which may be summed up in the statement that condensing and washing arrangements usually sufficient for an English summer are not necessarily equal to the climatic conditions of 1911. It has always been the rule to assume that an area equal to the winter requirement might be relied upon to take care of the summer make. That was all right so long as the proportion between the output in June, and that in December, was in the ratio of 1:3 or 1:4, but that is a thing of the past. The ratio is now 1:2, or even less. There is a large increase due to the cooking requirements in June, while the circumstances detailed in my first paragraph must tend to curtail the consumption in the dark days of December.

A day's fog, or a few dark afternoons in succession, are no longer matters of importance at the gas works. But the experience of this season goes to show that a plant, equal to efficiently coaling and condensing a million cubic feet per 24 hours in December,

is not sufficient for 600,000 cubic feet or so in June and July. The gas goes forward to the scrubber insufficiently condensed; *i. e.*, not freed from tar fog, and at too high a temperature, and the result is trouble from naphthaline on the works and in the district. In warmer climates, a hot spell is expected, and the condensers are protected from the rays of the sun, and perhaps provided with water sprays. But we have never judged such to be necessary, and the consequence is that those who already have the naphthaline fiend in their districts, find that he has taken in seven more worse than himself, and those who hitherto boasted immunity are now silent on the subject. In a general way the condensation part of the plant is the most liable to be neglected. Works having ample retort, purifier and holder capacity are close up to the wind in the matter of condensation, because plenty of retort and holder room shows immediate economy, and the same may be said of large purifying area, but the advantage of a large or variable area of condensation are not so obvious. They are none the less real. Of all the purifying plant there is no part affording a better return than an ample sized condenser. Some engineers are satisfied to bear the ills of insufficient condensation, rather than to fly to others that are supposed to be caused by too much of a good thing. Gentlemen holding such views should divide their condensing plant into two unequal sections, so as to admit of the extent in use being varied according to requirement.

A simple expedient that has been adapted in many cases with advantage, where the condensers are of the usual upright type, is to flood the exterior with water. A perforated ring of pipe is fixed at the top, the holes being on the interior so as to play on the surface of the condenser, and a cup of sheet lead is fixed at the base and provided with a suitable overflow. I have known this plan to have the effect of reducing the temperature at the condenser outlet a matter of 20° or so, with an insignificant expenditure of water. The hot weather also has the effect of showing up any weakness in the washing and scrubbing department. Ten per cent. more gas, at a temperature of 20° above normal, is a matter of some anxiety if there is no reserve capacity, because the absorbing power of water decreases as the temperature rises. It has also emphasized the need for strict attention to the soundness of inspection lids over seal pots and store tanks. When the liquor is at 80°, instead of the usual 60°, the loss of ammonia by evaporation may become very serious. On account of prevaled low temperature one is apt to get a little negligent in this respect. Then there is the question of the works water supply. Gas manufacture cannot be conducted without a sufficient supply of water for coke quenching, the furnace ash pans and the boilers, not to mention numerous other small but equally necessary demands. The water supplied in the district for domestic use is usually hard and expensive. It gives troublesome incrustations in the boilers, superheaters, and at any point where the temperature is raised, and at the usual price of 9d. to 1/. per 1,000 gallons becomes a costly item. It is usually supplied by a water meter, which is really not a meter at all but simply a flow indicator, so that the charge made has very little direct connection with the actual quantity passed, but is affected by the pressure and rate of flow. I have known 50 million works to be charged as much as £100 a year for their water supply. The result is that the majority of gas works, being situated on low marshy ground, with a good drainage catchment area—in a double sense the gas works is always in the lowest part of the district - find it more satisfactory to run their own little water works. A tube well, pump, and overhead store tank can be provided at a cost of £100 to £200, and a water softening apparatus, if necessary, for £30 to £40 more. The consumption of steam is not felt and the works engineer can comfortably take on the water supply in addition to his regular duties. As with the other matters referred to, the entire consumption and the dry weather has tried the resources where dependence was placed upon surface drainage.

An excellent plan is to provide a low level tank which can usually be arranged to receive all the rainfall from the roofs of buildings, while at the same time standing at a level sufficient to feed the furnance and coke quenchers in the retort house. A very few feet head will answer this purpose if the supply pipes are proportionately large. I have been able to arrange a tank, 10,000 gallon capacity, at a level of 8 feet above retort house charging floor, that catches all the rainfall from the various buildings, and in this way secures quite one-fifth of the total requirement. The water, being quite free from lime and earthy matters, not only leaves no deposit, but tends to clear pipes already slightly furred. When we used the town water, the cost for boiler composition, labor in chipping off scale, etc., was quite £25 a year. For 3 years we have not been required to buy boiler composition and very little chipping in the boilers has been necessary. There has also been some economy in raising steam. It is known that only one-eighth inch of scale on the interior of the boiler will increase the full account, and what is more important at busy times, reduce the working capacity.

The question of the exhaustion of our coal supply is one that, like the spots on the sun, comes up for consideration every few years and there is also the similarity that it appears to be equally beyond human control. It has lately been made a prominent feature by Sir William Ramsay, in an address on sources of energy and their exhaustion, delivered before the British Association for the advancement of science. This distinguished scientist seems to think that our great grandchildren will not have a very happy time. By some process of calulation which he describes as "easy" he has reached the happy conclusion that in 175 years time the supply of coal in this country will be exhausted and that as soon as the last ton of coal comes definitely in sight famine and misery will result. His consideration on the possibility of practically uplifting other sources of energy are not hopeful. He raises our hopes by showing that a ton of radium would drive a 15,000 ton steamship at the rate of 15 knots per hour for 30 years, thereby replacing a matter of 1½ million tons of coal. But only to dash them to the ground by the statement that the supply of that very energetic element will never exceed ½ ounce per annum, which leaves rather a small allowance per head when divided over a population of 40 millions. He can see no other likely source of energy than the combustion of coal and therefore insists on the necessity for economy in its use. In this busy hustling age most of us are fully occupied in providing for contingencies that may be expected, not in 175 years, but more like 175 minutes. At the rate science has moved not merely within the last 100 years, but within the present century, the condition of things about the period of 2100 A. D. may be expected to be so different from present day methods that comparisons on even lines are useless. But apart from speculative questions our modern manufacturing methods are simply a grand crusade against waste in every form. What are our endeavors to increase the make per ton, the yield of coke if they are not an attempt to carry out the sound advice tendered by Sir William Ramsay. One hundred and seventy-five years may after all be a very slight period of time, but the whole method of life, financial, technical, scientific, can be changed several times over in a much shorter period. True every century or so it is demonstrated that the whole theory of science up to date is wrong, so it is possible that the scientist who has the distinguished privilege of acting as successor to Sir William Ramsay in 1912 will put a very different complexion on the subject of the world's sources of energy.

Management & Commercial Methods.

GAS LIGHTING MAINTENANCE.—The United Gas Improvement Company has in operation in the city of Philadelphia 9 stores for the sale of gas appliances, employs a maximum of 70 men for the maintenance of gas lamps, and has, in addition, approximately 135 men selling gas appliances. This does not include any of the distribution department men, who may take care of new work in connection with handling complaints and the installation of appliances, or any of the members of the commercial or accounting departments. There are also 22 women employed as instructors or demonstrators, who explain to consumers, after installation has been made, the use of various appliances. As to the lamp sales, and the number of lamps on maintenance, the following approximate figures will apply:

Sales.

	1909.	1910.	6 Months, 1911.
Arc lamps	5,700	5,650	2,100
Lamps and mantles	23,000	43,200	15,100
Reflexoliers	1,250	2,000	800
Mantles	51,500	87,000	40,000

On Maintenance.

	1909.	1910.
Arc lamps	8,100	10,500
Single lamps	11,000	18,500

THE MONTREAL (CANADA) LIGHT, HEAT AND POWER COMPANY reports that it has out nearly 3,000 gas arc lamps on the maintenance system charge of 50 cents per lamp per month. It employs about 14 men in that department, maintaining these lamps. During last year about 700 lamps were put in service. The service division really is a combination gas and electric new business department, but the man-

agement does not believe in pushing electricity for lighting to the exclusion of gas; in fact, the idea is to give the consumer that which he desires. No restrictions are placed on the men as to the taking on of new lighting business other than that they must not interfere with present gas or electric installations. We employ 50 salesmen and are operating two appliance stores. Since January 1, 1911, we have sold nearly 5,000 stoves, which outnumbers twice and over any previous sales made by this Company for a similar period. The industrial gas department has been extremely successful, and recently the Canadian Pacific Railway shops installed gas for almost all of its work.

THE GAS APPLIANCE STORE OF THE PORTLAND (ME.) GAS LIGHT COMPANY reports that 330 stores in that city are now using gas for lighting, and that nearly 4,000 lamps were sold during the past year. The number of lamps under maintenance are as follows:

Inside Arc.	Outside Arc.	Single Units.
852	539	206

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

1,002,235. Lamp. J. Doorenbos, Kalamazoo, Mich., assignor to National Gas Light Company, same place.
1,002,278. Gas Heater for Steam Boilers. W. Kane, Philadelphia, Pa.
1,002,311. Gas Producer. S. M. Quinn, Iola, Kan.
1,002,315. Gas Lamp. V. A. Rettich, New York City.
1,002,593. Adjustable Reflector or Shade for Gas Lights. N. Macbeth, Philadelphia, Pa., assignor to Welsbach Light Company, same place.
1,002,672. Capacity Testing Apparatus for Gas Meters. T. Glover, London, England.
1,002,684. Gas Burner. A. E. Harris, deceased; H. E. Harris and A. L. Harris, executors, London, England.
1,002,697. Gas producer. G. H. Isley, Worcester, Mass., assignor to Morgan Construction Company, same place.
1,002,810. Gas Washer. N. Latta, Milwaukee, Wis., assignor to Allis-Chalmers Company, same place.
1,003,001. Valve for Gas Lamps. T. J. Little, Jr., Woodbury, N. J., assignor to Welsbach Light Company, Gloucester City, N. J.
1,003,053. Gas Burner, Albert Kunkler, Manheim, Germany.
1,003,282. Automatic Gas Cut-Off. D. S. Marple, Osborne, Kas.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

Modern Kitchens.—Under this title the Gas and Electric Company, of Baltimore, Md., has issued a handsome business-getting pamphlet describing, and fully illustrating, a number of the more important gas fuel installations in the city. The hotel range campaign has been one of the most successful so far conducted, and before long the gas man may stop any of the many hotels, and enjoy cooking of a sort for which the Batimore chefs are famous, with a sense of satisfaction over the fact that the meal was gas-cooked.

Railroad Commission of Indiana.—The Fifth Annual Report of this Commisson for the year 1910 has been published in book form. It covers the doings of the steam and elective roads, and also business done by the express companies.

Items of Interest
FROM VARIOUS LOCALITIES.

EVEN as Superintendent H. H. Ganser promises so does he perform. Chatting with him on the occasion of the last annual meeting of the Pennsylvania Gas Association, he declared that the building and fitting thereof of the future office quarters of the Gas Company of Montgomery County, Pa., and of the Norristown (Pa.) Electric Light and Power Company would be completed before Thanksgiving Day. And although 'tis quite a way in the future for the turning up on the calendar of that festive date and time, nevertheless Mr. Ganser's word is redeemed. The new offices and showroom of the named gas and electric companies, the site of which is on DeKalb street, below main, Norristown, Pa., were formally opened the last week in August, and the Companies' forces are comfortably installed therein. Not only does the comfort suit and appeal to the tastes of the said "forces," but like satisfaction is experienced by the patrons, and a like feeling even permeates within and radiates from without the rulers of the city and the citizens in general thereof, for the office building is a most pleasing addition to Norristown's rapidly growing number of examples of the modern office structure. A correspondent, under date of the 12th inst., forwards a description of the structure and its finishings, from which the following pertinent matter is taken: "The new office and showrooms of the gas, electric and steam companies has been opened to the public. Some months ago alterations and improvements were commenced on what has been known for years as the Odd Fellows' Building and more recently occupied by the Quillman Grocery Company. Within and without the building has been completely transformed, and to-day presents the finest appearance of the larger buildings of the city. The front, with its ornate marble trimmings, has been altogether renovated, and an electric sign, of large size and artistic arrangement, topped out with a huge gas torch, gives glowing evidence at night of the nature of the business which the structure houses. The first floor interior, is given over to the counting room and showrooms, the simplicity, but beautiful furnishings of which appeal to the eye of the seeker for harmony and the thought of the one inclined to comfort. Gas and electric appliances are here shown in great number and variety, and at every turn one is confronted by a polite and well-groomed salesman or attendant to whom the capacities and ways of use of the different things on show are as open books. To the rear of the main office is located the office of the Superintendent and the quarters of the solicitors, inspectors and collectors. Across the hall are the headquarters of the stockkeeper and the general foreman. The second floor carries the apparatus of the testing division supplemented by the room for the advertising publicity section. The third floor is arranged and equipped for the testing of meters, small repairs to lighting fixtures, storing of mantles and the like; and a spacious, airy, well lighted basement acts as shop rooms and the custody of general supplies. Take it all-in-all, the Norristown Company is most satisfactorily equipped with a home that is in keeping with the huge volume of business transacted therethrough; and Brother Ganser will be well pleased to outline its advantages to any of the fraternity who may happen to visit the flourishing up-to date Pennsylvania center of industry known to the State as Norristown."

JERSEY CITY, N. J., is about to have an election for Mayor, and one of the candidates for such office is a Mr. Andrew Knox, who classes himself as a Progressive Republican, eager and anxious to serve the public. His idea of serving the public, however, like the idea that animates pretty much all other persons of his stripe, is to "Whack the corporations," especially those that have to do with carrying the people to and from their daily tasks and those whose mission is to light their homes—the street railway companies and the gas and electric light suppliers. We do not know how or whence Mr. Knox earns his living, but we are positive that he owns neither street railway nor lighting Company shares, or any other sort of shares, wherefore his attitude towards corporations may be taken as "altogether unbiased." Save the mark! Yes, just as unbiased as is the thought of the highwayman who, knowing that his victim is likely to have a well lined wallet is anxious that the wallet shall change ownership. Here, in fact, is a sentiment that candidate Knox ridded himself of one night not long ago when appealing to the "free and untrammeled" citizens of Jersey City for their suffrage: "Under our charter and our State laws the Mayor is greatly hampered in any effort towards effective government; but his prestige is great, and if he is so minded he can achieve great results by using that prestige in public agitation for reforms. For example, we pay $1 per 1,000 cubic feet for gas. We ought not to pay over 75 cents, probably not over 50 cents. The Mayor has no control over that question, but he can make the city's law officers apply to the Public Utility Commission for a 75-cent gas order; and he can fight that case so as to make the Commission see to it that, if a just rate, based upon the value of the plant, is not fixed the Mayor will make a political issue of it and help to drive them out of office! If I am nominated and elected Mayor I will at once start a vigorous and determined fight to get for the people 75-cent gas, cheaper electric current and lower trolley fares, and will use all the great power and influence of that great office to make that fight succeed." Mr. Knox

would certainly deal hard knocks to the public utility corporations of Jersey City; but does it not seem that, in such violent pledging, he is knocking himself out, through pledgings which plainly declare that if the Commission does not name a rate that coincides with the Knox idea of rates, their end is nigh, if the knockers elect their man? In other words, does not Mr. Knox plainly prove it of himself that if elected he may not properly bind himself to protect the interests and welfare of all. However, whether Knox wins or whether Knox is knocked out, it is likely that justice in New Jersey will see to it that only a fair rate for gas or electric currents shall prevail, a rate fair to the manufacturer as well as fair to the user.

To-day the Public Service Commissioners, First New York District, will listen to arguments on the application of the proprietors of the Bronx Gas and Electric Company for the right to emit bonds in the sum of $80,000, under the first and refunding mortgage of $1,500,000 made to the Trustee (Knickerbocker Trust Company) July 1, 1910, and under which trust bonds amounting to $797,000 have been issued. The Company asserts the proceeds are to pay for plant betterments and extensions.

The sales per capita per month of the Consumers Gas Company, of Toronto, Canada, reach the rather surprising total of 6,019 cubic feet.

The Common Council of San Jose, Cal., after much proing and conning, finally evolved the following "main features" of an ordinance respecting the method-and-way that the local gas Company shall follow in "its dealings with our citizens:" The selling rate shall not exceed $1 per 1,000 cubic feet; 10 cents per 1,000 may be added to all bills not paid within 60 days after rendering; deposits on gas meters shall bear interest at the rate of 5 per cent. per annum; that suppliers shall not be required to furnish gas to persons consuming less than that in value; violations of the ordinance shall constitute a misdemeanor, punishable by a fine of of $100, or 30 days' imprisonment. What do you think of that? If some Chinaman launderer were refused a gas supply on the ground that his use of gas per month would be less than 75 cents in value, the "refuser" could get 30 days in jail visited upon him! But who is or who would be the "refuser? If it is the Company, why everyone connected with it—from President to watchman could be "put away!" And so, San Jose; is this thy thought of justice! However, no one has yet been "withdrawn" from the business life of San Jose, on the named account.

Before Mr. G. V. Greene was appointed Inspector of Gas, of Sioux City, Ia., by and under virtue of certain city ordinances adopted some time ago, "the people" were loud in their assertions that "air was being transmitted through the pipes," that the "candle power was deficient," that the "heat unit capacity was much below standard," etc. Well, here is the true story, as revealed by an average of the testings made by Mr. Greene for 4 months: Minimum candle power, 22; maximum, 24; average, 23—the standard calls for 21. On heat unit account: Maximum, 632; minimum, 609; average, 613; the standard calls for 600.

The Gas Machinery Company, of Cleveland, O., has accepted contracts to furnish silica retorts and settings for and to these plants: Kewanee and Sterling, Ills.; Marshall, Mich.; Clearfield, Pa.; Waterloo, Ia.

Messrs. Adolph Phillip and Oscar Mueller, of the great manufacturing concern with which they are so closely connected (it seems hardly necessary to mention that that concern is the H. Mueller Manufacturing Company, of Decatur, Ills.) recently returned from an extended trip through Canada, which trip was made with a view to ascertaining whether or not a site could be selected whereon to locate a factory for the producing of their specialties taken by Canadian customers. The decision was not reached, but the visit certainly simplified matters in respect of making ready for a final decision. The Company does not in any sense intend to leave Decatur, now or at any other time; the Canada venture has to do with "duties" that are ofttimes onerous.

The Union Light, Heat and Power Company (a natural gas concern) has been supplying gas to Dayton, Ky., for a number of years. Originally beginning with a 15-cent per 1,000 cubic feet charge, the proprietors managed to increase that charge to 30 cents. Now, while the people grumbled quite a bit when the successive elevating steps were being taken; but at 35 the "last nickel" was put on. The authorities complained, the Company stood pat, the courts were invoked, and this is the result as per the decision of Mr. Justice Yungblut: "It is, therefore, adjudged that defendant, by virtue of the contract under consideration, has since August 1, 1910, and is now, required to supply the inhabitants of the city of Dayton with gas as provided for in said contract, at 35 cents per 1,000 cubic feet, if paid within 10 days from date of bill therefor; and that this cause be now referred to the Master Commissioner of this Court, to ascertain and report what overcharge, if any, were paid by plaintiffs, and those on whose behalf they sued, by whom so paid and the amounts." This means that the rate shall be equal to the rate paid by the inhabitants of Newport, Ky., for it was declared in the original grant that, no higher rate should be charged in Dayton than was being charged in Newport. The Newport rate is 30 cents.

On the evening of the 12th inst., a meeting of the employees of the Public Service Gas Company, of New Jersey, Commercial Section, of National Commercial Gas Association, was held in the office of the Company, 759 Broad street, Newark, N. J. Mr. W. H Pettes directed the proceedings, which were shared in by 300 members. The chief subject under discussion had reference to the "Economical Home Light" campaign, which is about to be inaugurated by the Company. The discussion was a spirited one, and those who shared in it were evidently fully alive to the importance of pushing the sale of these lights to the utmost extent. It is a source of great satisfaction, and of congratulation too, to those who inaugurated the meetings to witness the way in which the attendance keeps up, and to observe the keen interest shown during the discussion of the subjects submitted.

Manager Snow, of the Holyoke (Mass.) municipal gas plant, does not seem in any wise disconcerted over the hysterical efforts of the Holyoke Board of trade to cause the estabishment forthwith in that city of an 80-cent per 1,000 rate. The Directors of this section of Holyoke's trade, knowing that cutting gas prices will not interfere with the prices they are getting on private account for boots and shoes, calicoes and ginghams, sugar and molasses, tea, oil and tacks, etc., and further knowing that gas is a pretty good agent for lighting their shops, heating their small industrial apparatus, cooking their food and driving their motors, naturally favor cheap gas, so they shout for cuts immediate. In mild reply, Manager Snow remarks that, when the taxpayers permit the bonds necessary to put the plant in such modern physical fashion, that advantage may be taken of the economies giving therewith, a reduction is possible when the suggested improvements become actual physical facts.

"G. W. M.," writing from North Adams, Mass., under date of the 15th inst., says; "I inclose you a story, from the columns of our local paper, *The Transcript*, printed two days ago, which seems worth publishing—think how close to an asylum would the gas men of 50 years ago think the narrator was were that story even predicted then: 'Nearly asphyxiated by illuminating gas, at an altitude of 3,000 feet, and providentially dropping from the rigging of his balloon into the basket thereof. Mr. H. P. Sherman, according to his account, had a more thrilling experience than that indicated by appearances when discovered practically unconscious yesterday morning. Sherman, who left the hospital in Lewiston, Me., this morning, on his way to New York says, that the trouble was in the appendix of the balloon, which failed to open when the rope parted. He was up for quite a time before he noticed anything wrong, and when he did realize the situation he was at a dangerous altitude owing to the expansion of the gas which could not escape through the 'appendix.' The only thing he could do was to climb into the rigging and cut the opening with his knife. When the gas was liberated it came with a rush directly in his face. He lost his breath and dropped. Some little time later he came to and found himself hanging over the side of the basket. He said it was a wild ride. He encountered wind and rain storms, the wind howling as through a forest. Except for his general direction he completely lost track of where he was going. On two attempts to descend he could not find a landing place, seeing nothing but lakes and trees. When he did see a likely spot it was a question of seconds and he had to land quick to make it. Striking the ground, he believes he was rendered unconscious, and was dragged about 200 feet, bringing up against a stone wall, and knew nothing more until roused by Mr. Estes. He suffered intensely from the cold in the higher altitudes.'"

The Market for Gas Securities.

The unsettled condition of the general share market was again reflected in the market mirrors by a slump all around. Consolidated gas was amongst the sufferers, the opening to-day (Friday) was 131 to 131½, and but few transactions were recorded in it. There is absolutely no good reason why Consolidated should decline; in fact, to the most positive contrary, there is every reason why it should go far beyond the figures given to-day.

Brooklyn Union, too, is nominally duller and lower, but there is next to nothing done in these shares which represents actual transfer of stock. The general condition to day is for lower figures on all sides in shares of all sorts, although bond issues of good repute are in fair demand and at fairly good figures.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

SEPTEMBER 25.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	131	131⅛
Central Union Gas Co. —				
1st 5's, due 1972, J. & J.	3,000,000	1,000	103	105
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101⅛
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	50	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	129	133
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅜	½
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	102	102½
Preferred	2,500,006	100	114	120
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91⅛	92
Preferred	25,000,000	100	96¼	96½
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	103½	103¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	105
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	448	450
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 18, 19, 20, 21, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ———— Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Oct 6, 1911. New York City. Officers: President, M. J. Brayton, Utica, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. 25, 26, 27, 1911, Chicago, Ills. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 26 West 39th street. New England, Secretary, W. S. Farrow, 1290 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, S. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Clinton, Ia. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, October 23-28, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912; Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Pacific Coast Gas Association.—Annual meeting, Sept. 19, 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers, President, C. W. Butterworth, Millon, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 89th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers, President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1912; Houston, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.